This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

**Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

**About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B

DEPOSITED IN
BOSTON MEDICAL LIBRARY,
BY THE
PUBLIC LIBRARY OF THE
CITY OF BOSTON.

★ Shelf No 3808.60
Vol. 23
1894

BOSTON
MEDICAL LIBRARY
8 THE FENWAY

# ARCHIVES

OF

# OTOLOGY

*EDITED IN ENGLISH AND GERMAN*

*5808.60
V 23
1894

BY

DR. H. KNAPP
OF NEW YORK

DR. S. MOOS
OF HEIDELBERG

AND

DR. U. PRITCHARD
OF LONDON

VOLUME XXIII.

NEW YORK
G. P. PUTNAM'S SONS, 27 & 29 WEST 23D STREET
AND NEW ROCHELLE, N. Y.
LONDON: 24 BEDFORD STREET, STRAND
WIESBADEN: J. F. BERGMANN'S Verlag
PARIS: J. B. BAILLIÈRE, 19 Rue Hautefeuille
1894

l

+5808.60
1.23
1894

B H.
Jan 22, 1894
1 v. Cont.

COPYRIGHT, 1894
BY
G. P. PUTNAM'S SONS

BOSTON MEDICAL
DEC 22 1964
LIBRARY

Printed and Bound by
The Knickerbocker Press, New York
G. P. PUTNAM'S SONS

# CONTENTS OF VOLUME XXIII.

## NUMBERS 1 AND 2.

PAGE

1. Contributions to the Study of the Pathology of the Mastoid Process. By Dr. E. Schmiegelow, Copenhagen. Translated By Dr. S. E. Allen, Cincinnati. (With two charts in the text) . . . 1

2. On Systematic Procedure in Operations for the Relief of Intercranial Disease Secondary to Ear Suppuration. By Urban Pritchard, London . . . . . . . . . . 24

3. Some Remarks on the Anatomical Points Concerned in the Stacke Operation. By Samuel Ellsworth Allen, M.D., Cincinnati . 35

4. Purulent Otitis Media Leading to Caries of the Temporal, Epimeningeal Abscess, and Death, while the Mastoid Process Remained Intact. By George Reuling, M.D., Baltimore. (With two figures in the text) . . . . . . . . . . 44

5. A Case of Anchylosis of the Stapes and a Case of Nerve Deafness, with Manometric Examinations and Autopsies. By Prof. F. Bezold, Munich. Translated by Dr. Ward A. Holden. (With Plate I. of vol. xxiv. of German Edition. To be furnished in the next number) . . . . . . . . . . . . 48

6. Two Cases of Basal Fracture. By Dr. Schmiedeke, Surgeon German Army. Translated and abridged by Dr. J. A. Spalding, Portland, Me. (With one figure in the text) . . . . . . . 58

7. A Case of Primary Tuberculosis of the Mastoid Process. By Herman Knapp . . . . . . . . . . . . 64

8. On Sero-Mucous Cysts beneath the Wing of the Nose; with the Report of a Case. By Herman Knapp . . . . . . 67

9. Removal of Sequestra and a Tooth from the Floor of the Nose. By Herman Knapp . . . . . . . . . . 71

10. The Percussion of the Mastoid Process, with the Report of a Recent Case of Diabetic Caries of this Portion of the Temporal Bone. By O. Koerner and R. von Wild, Frankfort-on-the-Main. Translated by Dr. S. E. Allen, Cincinnati . . . . . . 73

PAGE
11. Concerning the Diagnostic Value of Percussion of the Mastoid Process. By S. Moos. Translated by S. E. Allen, M.D. . . 85

12. Report on the Transactions of the Section of Otology of the Sixty-Fifth Meeting of the Society of German Naturalists and Physicians held at Nuremberg from September 11 to September 15, 1893. By Dr. Fr. Bauer, Nuremberg. Translated by Dr. Max Toeplitz, New York . . . . . . . . . . . 86

13. Report on the Progress of Otology during the First Half of the Year 1893. By Prof. Ad. Barth, Marburg, and Dr. Arthur Hartmann, Berlin. Translated by Dr. Max Toeplitz, New York . . 92
   A.—Anatomy.
   B.—Physiology and Physics. } By Ad. Barth.
   C.—Pathology and Therapeutics. By A. Hartmann.

14. Second Meeting of the German Otological Society. At Frankfort-o.-M., on May 20 and 21, 1893. Reported by Dr. E. Bloch, Freiburg-i.-Br. Translated by Dr. Max Toeplitz, New York . 128

15. British Notes . . . . . . . . . . . . . . 134
   Societies.
   Miscellaneous.
   Appointments.

16. Book Reviews . . . . . . . . . . . . . 142
   Text-book of Otology for Physicians and Students. By Dr. L. Jacobson, Berlin.
   Manuel Pratique des Maladies des Fosses Nasales, de la Cavité Naso-Pharyngienne et des Sinus de la Face. By E. J. Moure, Bordeaux.
   Die Otitischen Erkrankungen des Hirns, der Hirnhäute und der Blutleiter. (The Otitic Diseases of the Brain, the Meninges, and Venous Sinuses). By Dr. Otto Körner.
   Pyogenic Infective Diseases of the Brain and Spinal Cord—Meningitis, Abscess of the Brain, and Infective Sinus Thrombosis. By Wm. Macewen, M.D., Glasgow.
   Atlas of Head Sections. By Wm. Macewen, M.D., Glasgow.
   Normale und pathologische Anatomie der Nasenhöle und ihrer pneumatischen Anhänge. Vol. I., 2d ed. By E. Zuckerkandl.
   System of Diseases of the Ear, Nose, and Throat. By Chas. H. Burnett.

17. Obituary . . . . . . . . . . . . . . 149
   Dr. Robert Wreden.
   Dr. Giuseppe Sapolini.

18. Supplement to the Paper "On Sero-Mucous Cysts beneath the Wing of the Nose." (Page 67, etc., of the present volume.) By Herman Knapp . . . . . . . . . . . . 150

19. Supplement to the Communication of "Removal of Sequestra and a Tooth from the Floor of the Nose." By Herman Knapp . . 152

---

NUMBER 3.

1. A Case of Otitic Brain Abscess (Chronic Otorrhœa, Optic Neuritis, Homonymous Hemianopsia. Opening of Mastoid and Skull. Cerebral Hernia. Recovery). By Dr. Herman Knapp, of New York . . . . . . . . . . . . . . 155

PAGE

2. Can Important Topographical Relations of the Temporal Bone be Determined from the Form of the Skull? As Answered in Part by Five Hundred Skull Measurements. By Dr. B. Alexander Randall, Philadelphia. (With three figures in the text) . . 162

3. Investigations with Tuning-Forks of Middle Register in over Six Hundred Cases. By Henry A. Alderton, M.D., Brooklyn, N.Y., 171

4. Three Fatal Cases of Otitic Intra-Cranial Complications. By Prof. S. Moos, Heidelberg. Translated by Geo. L. Morgenthau, Chicago, Ill. . . . . . . . . . . . . . 198

5. Bilateral Hæmatoma of the Lobule. By Dr. B. Alex. Randall, Philadelphia . . . . . . . . . . . . . 207

6. A Case of Basal Fracture. By John Dunn, M.D., Richmond, Va., 209

7. A Case of Otitis Hèmorrhagica Externa. By John Dunn, M.D., Richmond, Va. . . . . . . . . . . . . 211

8. Investigations Concerning the Average Hearing Power of the Aged. By Prof. F. Bezold, Munich. Translated by Dr. S. E. Allen, Cincinnati . . . . . . . . . . . . . . 214

9. The Presbycusic Law. By Dr. H. Zwaardemaker, Utrecht. Translated by Dr. S. E. Allen, Cincinnati. (With Plates II., III., and IV., of vol. xxiv., German Edition) . . . . . 228

10. A Hitherto Undescribed Course of a Disease of the Mastoid Process. By Dr. S. Moos, Heidelberg. Translated by Dr. J. A. Spalding, Portland, Me. (With three figures on Plates V. and VI. of vol. xxiv., German Edition) . . . . . . . 235

11. Book Review . . . . . . . . . . . . . . 241
    Atlas of Laryngology and Rhinology. By A. Gouguenheim and J. Glover.

12. British Notes . . . . . . . . . . . . . . 245

13. Obituary . . . . . . . . . . . . . . 253

Plate I., vol. xxiv., German Edition. To illustrate the paper by Prof. Bezold in the preceding number.

---

## NUMBER 4.

1. Primary Disease of the Bony Labyrinthine Capsule. By Prof. Adam Politzer, of Vienna. Translated by Dr. J. A. Spalding, Portland, Maine. (With eight figures in the text) . . . . . . 255

2. A Contribution to the Symptomatology of Rhinitis Chronica Atrophica, with Special Reference to the Affections of the Ears. By Dr. J. Morf, of Winterthur. Translated by Dr. J. A. Spalding, Portland, Maine . . . . . . . . . . . 271

3. On Monaural Diplacusis. By Prof. G. Gradenigo, Turin. Translated by Dr. Ward A. Holden . . . . . . . . 280

PAGE

4. On Double Hearing. By Dr. Hans Daae. Translated by Dr. A. B. Kibbe, Seattle, Washington . . . . . . . . . 283

5. Hearing for Speech and Hearing for Tones in General, and the Measurement of the Latter by Gradenigo's Auditory Field. By Dr. H. Zwaardemaker, of Utrecht. Translated by Dr. A. B. Kibbe, Seattle, Washington . . . . . . . . . 291

6. History of a Brain Tumor. By Prof. S. Moos, of Heidelberg. Translated by Dr. A. B. Kibbe, Seattle, Washington. (With Plates I. and II. of vol. xxv. of German Edition. The plate is erroneously marked xxiv., and Fig. 4 on Plate II., Fig. 3) . 304

7. Report on the Progress of Otology during the Second Half of the Year 1893. By Prof. Ad. Barth, Marburg, and Dr. Arthur Hartmann, Berlin. Translated by Dr. Max Toeplitz, New York, 319
   - I.—Normal and Pathological Anatomy, Histology, and Physiology of the Hearing Organ and the Naso-Pharyngeal Cavity. By Prof. Ad. Barth, Marburg.
   - II.—Pathology and Therapeutics of the Ear, Nose, and Naso-Pharynx. By Dr. Arthur Hartmann, Berlin.

8. Report on the Annual Meeting of the British Medical Association, Held at Bristol on August 1st, 2d, and 3d. Section of Laryngology and Otology. By Mr. Harsant, of Bristol, Secretary . 367

9. Reviews . . . . . . . . . . . . . . . . 371
   - Thrombosis of the Lateral Sinus Due to Purulent Otitis Media and its Operative Treatment. By Arthur Af Forselles.
   - The Lip-Reading of Persons with Hardness of Hearing. By Julius Müller.

10. Editorial Notice . . . . . . . . . . . . 380

11. Contents of the Last Numbers of the *Zeitschrift f. Ohrenheilkunde* (the German Edition of these ARCHIVES), Published in July and September, 1894 . . . . . . . . . . . 381
   - *A*.—Original Articles.
   - *B*.—Reviews of Books.

12. Obituary . . . . . . . . . . . . . . . 382
   - Prof. Hermann von Helmholtz.

13. Index . . . . . . . . . . . . . . . . 383

# CONTENTS OF VOLUME XXIII., NUMBER 4.

1. Primary Disease of the Bony Labyrinthine Capsule. By Prof. Adam Politzer, of Vienna. Translated by Dr. J. A. Spalding, Portland, Maine. (With eight figures in the text) . . . . . . 255
2. A Contribution to the Symptomatology of Rhinitis Chronica Atrophica, with Special Reference to the Affections of the Ears. By Dr. J. Morf, of Winterthur. Translated by Dr. J. A. Spalding, Portland, Maine . . . . . . . . . . . 271
3. On Monaural Diplacusis. By Prof. G. Gradenigo, Turin. Translated by Dr. Ward A. Holden . . . . . . . . . 280
4. On Double Hearing. By Dr. Hans Daae. Translated by Dr. A. B. Kibbe, Seattle, Washington . . . . . . . . . 283
5. Hearing for Speech and Hearing for Tones in General, and the Measurement of the Latter by Gradenigo's Auditory Field. By Dr. H. Zwaardemaker, of Utrecht. Translated by Dr. A. B. Kibbe, Seattle, Washington . . . . . . . . 291
6. History of a Brain Tumor. By Prof. S. Moos, of Heidelberg. Translated by Dr. A. B. Kibbe, Seattle, Washington. (With Plates I. and II. of Vol. XXV. of German Edition. The plate is erroneously marked XXIV., and Fig. 4 on Plate II., Fig. 3) . 304
7. Report on the Progress of Otology during the Second Half of the Year 1893. By Prof. Ad. Barth, Marburg, and Dr. Arthur Hartmann, Berlin. Translated by Dr. Max Toeplitz, New York, 319
    - I.—Normal and Pathological Anatomy, Histology, and Physiology of the Hearing Organ and the Naso-Pharyngeal Cavity. By Prof. Ad. Barth, Marburg.
    - II.—Pathology and Therapeutics of the Ear, Nose, and Naso-Pharynx. By Dr. Arthur Hartmann, Berlin.
8. Report on the Annual Meeting of the British Medical Association, Held at Bristol on August 1st, 2d, and 3d. Section of Laryngology and Otology. By Mr. Harsant, of Bristol, Secretary . . 367
9. Reviews . . . . . . . . . . . . . 371
    - Thrombosis of the Lateral Sinus Due to Purulent Otitis Media and its Operative Treatment By Arthur Af Forselles.
    - The Lip-Reading of Persons with Hardness of Hearing. By Julius Müller.
10. Editorial Notice . . . . . . . . . . . . . 380
11. Contents of the Last Numbers of the *Zeitschrift f. Ohrenheilkunde* (the German Edition of These Archives), Published in July and September, 1894 . . . . . . . . . . . . 381
    - *A.*—Original Articles.
    - *B.*—Reviews of Books.
12. Obituary . . . . . . . . . . . . . 382
    - Prof. Hermann von Helmholtz.
13. Index . . . . . . . . . . . . . . 383

during childhood the ear did not run. Since then the hearing markedly diminished on that side. December 26, 1889, was taken with influenza, during which there developed *painlessly* a right-sided facial paralysis. February 20, 1890, consulted Dr. Windelschmidt in Cologne. Paralysis considered purely nervous and electrical treatment applied without benefit. After three or four months began to experience pain in the neighborhood of the ear. Consulted Dr. Keller, who made out a tumor in the meatus and tried to remove same with the galvano-cautery.

On November 25th he went to Berlin. Had periodical attacks of violent pain in the ear, and now and then pain in right side of head. No dizziness, nausea, ear noises, or similar symptoms.

*June* 3, 1891. Pain had increased so that he entered the otological department of the hospital. Report of Dr. Jansen: Complete right-sided facial and hypoglossal paralysis, with alterations in the vagus and sympathetic. Meatus closed by a hard tumor attached by a broad base to the posterior wall. Tumor not granulating, but covered entirely with epidermis. Not sensitive to pressure. No trace of suppuration. In depression between lower jaw and processus mastoideus a very sensitive enlarged gland. Along the neck other glands. From a microscopical examination of a portion of the tumor, in connection with the clinical history, a diagnosis of sarcoma was made. In a few months (August 14, 1891) patient dismissed as *unfit for operation.*

*March* 1, 1892. A few days before he consulted me for the first time, the pain had increased so that he could neither sleep nor work. Right side of head feels heavy, is dizzy when he walks, no appetite. Greatly reduced in weight, looks pale and miserable. Pulse, strong, normal. Pain on moving lower jaw. Swollen glands in right retro-maxillary region very sensitive to pressure. No sensitiveness or alteration in form about the mastoid process. Total paralysis of facial nerve. Tongue can only be extended a few *mm* beyond the teeth. Right side of the tongue atrophic. Voice and deglutition normal. No discharge from right meatus. Same filled by a moderately hard, dense, pale-red polyp, attached by a broad base to the posterior wall. Its surface covered with epidermis. Hearing in right ear for watch and whispering nil. Patient sent to St. Joseph Hospital, put to bed, and warm poultices ordered. Morning temperature, 38.1°.

*March 2d.*—Operation under chloroform. By means of a curved incision the external ear was separated and together with the membranous meatus pushed forward. Meatus filled with polypi and cholesteatomatous masses. Bony canal destroyed to a great extent just medial to external opening. Granulations extend through the defect in wall of meatus into the processus mastoideus. Mastoid was then opened up. Immediately under the smooth, sound, but very thin (1-2 *mm*) cortical layer, a cavity as large as a walnut. Same filled with granulation tissue and cholesteatomatous masses. These removed with sharp spoon. Marked pulsation deep in. Dura exposed up to the posterior cranial fossa. In this direction the finger can be introduced to a depth of five *cm* from the surface of the process. Granulation tissue near the surface mixed with cholesteatomatous masses, deep in, exclusively granulations. Cavity extends forward into the middle ear. Same filled with granulations. Entire posterior wall of meatus was removed, bringing meatus and cavity in mastoid into communication. Cavity cleaned out with sharp spoon. Bleeding profuse. Wound tamponed with iodoform gauze, three sutures placed at the upper angle of the incision, and whole covered with cotton and bound.

*March 3d.*—Yesterday evening temperature 39.4°. This morning 38°. No headache.

*March 5th.*—Bandages changed, having become soaked through with blood.

*March 21st.*—Out of bed. Goes out and has commenced work. Facial and hypoglossal paralysis unchanged. The wound is dressed every third day and tamponed with iodoform gauze. There is some fetor. In the depth of the extensive cavity are numerous shreds of necrotic tissue. Understands half loud speaking in his immediate vicinity.

*March 25th.*—Cholesteatomatous masses and flabby granulations springing up in the posterior cranial fossa. These removed to-day with sharp spoon, spoon entering the posterior fossa to a depth of five *cm* from surface of mastoid.

Subjectively patient perfectly well. Paresis unchanged.

*April 8th.*—Subjectively perfectly well. Paresis unchanged. No dizziness. Appetite good. Cavity is very large and secretes a somewhat offensive pus. Deep in, gangrenous shreds.

*April 10th.*—Was taken this noon with severe attacks of dizziness, and vomiting. The attacks ceased in the course of half a day. He attributes same to over-exertion at work.

*April 16th.*—Well since last date. No dizziness. Electrical reaction of right facial nil. Right hypoglossal on the contrary reacts plainly to both faradic and constant currents, although much less than the left nerve. Sense of taste in the front half of the right side of tongue wanting. (Dr. Dethlefsen.)

*April 19th.*—Had another sudden attack of dizziness with vomiting, which disappeared suddenly after a couple of hours.

*May 4th.*—Similar attacks of dizziness.

*May 9th.*—General condition good. Cavity closing. No pain.

*June 8th.*—No attacks of dizziness during past month. Cavity filling up. Granulations healthy. Paralysis of tongue better.

*Aug. 8th.*—The wound behind the ear is healed. No secretion from meatus. The somewhat narrowed meatus opens up posteriorly and above into a cavity lying within the processus mastoideus. Whole covered with epidermis. Watch heard at one *cm*. Tuning-fork on head heard in right ear. Feels clear in his head. Paresis of facial and hypoglossal unchanged.

*Oct. 12th.*—Perfectly good health. Condition of ear same as on last date.

*Dec. 16th.*—Continued good health. Hears watch at a distance of 70 *cm*, and whispering at 2 *m*. The pale, markedly thickened *Mt* with handle of malleus can be seen through the meatus. Facial paresis unchanged. Hypoglossal paresis and hemiatrophy of the tongue have nearly disappeared.

*Summary.*—We have here to do with the case of a young man of twenty-two, who, at the age of six, contracts a suppurative otitis during an attack of scarlatina, and who up to December, 1889, has felt perfectly well. He then has an attack of influenza, during which a right-sided facial paralysis develops, and this paralysis is treated by electricity without the slightest benefit. After he has had the facial paralysis for three or four months, he is taken with pain in the ear; a tumor is perceived within the meatus, and he is put under otological treatment. The tumor operated upon during the following year constantly recurs. During this time exudation from the ear has only been present as the immediate consequence of operative treatment. Pain in the region about the ear occurs with varying severity. Long intermissions are broken by severe attacks of pain. The pain radiates out over the right side of the head, and at last so increases that he can no longer work, and he is taken into the University ear clinic at Berlin.

He presented at his entrance all the signs of a complete right-sided facial and hypoglossal paralysis, and the auditory canal was entirely filled by a broad-based, epithelial-covered tumor attached to its posterior wall.

The processus mastoideus presented no diseased alterations other than these. In the retro-maxillary region and along the neck were swollen and sensitive glands. The diagnosis of sarcoma of the temporal bone was made, he was given iodide of potash, but operative treatment, with the exception of the excision of a piece of the polyp for microscopical examination, abstained from. On August 14, 1891, he was dismissed under the impression that he was not a fit subject for operation.

His condition remained about the same, although the pain seemed to be somewhat less, and during the past winter he was able to work as an engraver in a silverware manufactory. This state continued till the last days of February, 1892, when the pain in the head and ear increased so that he could neither sleep nor work, and on the first of March he consulted me in the very miserable condition described in the clinical history.

The case was not clear. I was, however, certain that I had to do with a grave affection, probably with a tumor of the temporal bone, and that this tumor stood in causative relation to the paralysis of the facial and hypoglossal nerves. The fact that the patient was a young and powerful man indicated that we had to do with a sarcoma which had attacked the facial canal, and at the same time had broken into the posterior cranial fossa and had worked its way toward the condyloid foramen, and had there destroyed the hypoglossal.

In operating on a sarcoma of the temporal bone, one not only has very little hopes of recovery, but runs the risk of having the patient die on the table from hemorrhage. Küster[1] reported a case where he operated upon a cavernous sarcoma springing from the pyramidal portion of the temporal bone, and where he was obliged to stop on account of hemorrhage. The bleeding continued in spite of ligation of the common carotid, and the patient died one half hour afterward. The post-mortem revealed the internal carotid intact. The blood had come from the tumor itself.

---

[1] *Berliner kl. Wochenschrift*, 46, 1881. Ref. in *Arch. f. Ohrh.*, xviii., page 187.

On the other hand, however, cases have been reported[1] where a radical removal has been accomplished without immediately dangerous hemorrhage, and with the view of alleviating temporarily the distressing symptoms. Haug[2] mentions such a case. The patient died, however, three months afterward from meningitis due to a recurrence of the growth. Similar unfortunate cases appear in the literature.[3] Whether one operates or not, death generally ensues in the course of a year from the beginning of the disease.[4]

Impressed by these facts, it was not very encouraging for me to operate upon a patient who, seven months before, had been dismissed from the University otological clinic of Berlin as not being a case for operation. And if I dared to make the attempt, it was partly out of consideration for the patient, who was so miserable that he wanted something done at any cost, and partly because I thought that after all the tumor might not be malignant but of inflammatory origin. The following facts urged this supposition and caused me to believe in the possibility of the non-sarcomatous nature of the trouble. First, it was remarkable that a sarcoma could remain confined to the temporal bone for more than two years without perforating the surface of the mastoid. In all the cases of sarcoma of the mastoid process hitherto referred to, fistulous tracts formed through the same in the course of a few months, the growth growing through to the surface, and at the same time penetrating deep into the cranium. In our case, on account of the paresis, we were obliged to assume that the latter had taken place. The mastoid region, however, contrary to the rule, was perfectly sound. Second, a purulent discharge was entirely absent. The ear had always been dry except just after the extirpation of the polypi. In all the reported cases of sarcoma, where the growth had extended into the meatus, there was an abundant fetid discharge, often accompanied by violent bleeding. These hemorrhages were absent in my case.

---

[1] See also Case 3 at end of this article, p. 21.

[2] *Arch. f. Ohrenh.*, xxx., p. 126.

[3] See the citations in Haug's article.

[4] In a case described by Vermyne (*Trans. of Am. Otological Society*, 17th annual meeting, vol. iii., part 3) the disease did not attack the labyrinth until after seven years of total blindness.

On operating, great was my astonishment to find the conditions mentioned in the clinical history. The granulations could not all be removed on account of the violent bleeding, neither was I successful in determining the condition within the tympanic cavity. The wound was, however, tamponed with gauze and a bandage applied.

The process of repair was afebrile with the exception of an elevation of 39.4° on the evening following. The effect of the operation was immediate. The pain and feeling of heaviness in the head disappeared and nineteen days after the operation the patient could go out and begin his work. He was treated at the clinic from that time till August 1st. The wound behind the ear healed, the discharge from the ear ceased, and the tympanic cavity became covered with epidermis. To remind him of his grave illness, there is at present, with the exception of the facial and hypoglossal paresis, a deep cicatrix behind the ear. The labyrinth is uninjured and the patient hears the tuning-fork on the head in the right ear.

During the after-treatment, the patient had two attacks of dizziness with vomiting, so that I feared the labyrinth had become affected, or that the growth had attacked the brain. The attacks, however, disappeared every time very quickly, which indicated that they were of reflex character. The patient himself ascribed them to over-exertion at work.

It must be further observed that twice during the after-treatment it was necessary to remove cholesteatomatous masses and granulations from the posterior cranial fossa.

As concerns the function of the ear the result was also good, the patient, in spite of the extensive destruction and the long continuance of the trouble, being able to hear the watch at a distance of 70 *cm* and whispering at 2 *m*.

If we inquire into the nature of the trouble we have been considering, we see that the results of the clinical and the histological examination were different.

As to the histology of the growth I am able to say that both Dr. A. F. Rasmussen and myself examined microscopically the granulations removed during the operation and found them to consist of a vascular, connective tissue thickly infiltrated with small round cells. Dr. R. considered the tumor a small round-celled sarcoma, resembling very much a glioma. A similar diagnosis was made in Berlin from a piece of the extirpated polyp.

Clinically, however, one cannot hold to this diagnosis. First, because a simple and incomplete removal with the sharp spoon could scarcely have brought about the cure of a round-celled sarcoma of such proportions. Then the trouble in the middle ear itself, as well as that in the posterior cranial fossa, was done away with permanently, to judge from the progressive diminution in the hypoglossal paresis, which after nine months had almost completely disappeared. Had it been a round-celled sarcoma, and had there been portions left within the cranial fossa, these would have probably quickly developed and caused an increased pressure upon the hypoglossal and neighboring cranial nerves. Secondly, the slow growth of the tumor speaks against sarcoma. A round-celled sarcoma usually causes, in a few months, an extensive destruction of the temporal bone and death either by bleeding, meningitis, or exhaustion. In this case the destructive process had existed two years and three months before he was made the subject of radical operative treatment.

The tumor might have been syphilitic, tubercular, or due to actinomyces, as the histological basis of these is vascular granulation tissue, but we find no support for these suppositions. The ineffectual use of the iodide of potash speaks against syphilis, and the absence of tubercle formation and of the fungus against tuberculosis and actinomycosis.

The trouble in the temporal bone can much more properly be conceived as a chronic inflammatory process. The commencement of the inflammation dates from the sixth year of the patient, when his otorrhœa first developed and shortly after apparently ceased. It is very probable, however, that a latent focus of inflammation existed in the region of the antrum during his entire childhood (the hearing was notably bad in right ear, although he cannot remember that he had a running from it). In consequence of the influenza, this inflammation flared up again and caused a slow carious destruction. This attacked the Fallopian canal, producing paralysis of the facial, and, working through the cells, destroyed the posterior wall of the meatus (through which defect the polyp grew), and extended posteriorly into the cranial fossa and pressed upon the hypoglossal.

It is somewhat remarkable that this inflammation was not accompanied by a purulent exudation. I remember, however, having seen several cases where, the drum being imperforate, the caries had broken through the upper posterior wall of the meatus, and yet the exudation was so slight that the auditory canal appeared quite dry. Operation on these cases disclosed cavities in the mastoid filled with granulations and some cholesteatomatous masses, but free from pus.

### *II.—Chronic right-sided middle-ear suppuration—Pyæmia—Cholesteatoma of the petrous portion of the temporal bone and middle cranial fossa—Mastoid region healthy—Pneumonia—Septic empyæma—Opening of transverse sinus and of pleural cavity—Recovery in six months.*

Henrik Vriborg, age five. Admitted by me on June 1, 1890, to the St. Joseph Hospital. Right-sided otorrhœa since earliest childhood. A year and a half ago he was treated in the polyclinic for polypi in right ear. The following, dated March 29, 1890, was entered in the journal: A granulation tumor the size of a pea arises from the upper wall of the auditory canal at the border between the bony and membranous meatus. Kidney-shaped defect in the drum; manubrium mallei hangs free; mucous membrane of promontory smooth. Granulation tumor removed with the snare. During April and May patient stayed away from treatment.

According to the mother, on the night of May 28th he had a severe chill, and during the following days, one or two attacks daily.

*June 2d.*—Temperature this morning, 37°; evening, 40.2°. Now and then a chill. Skin dry, burning hot; lips scaling. No sensitiveness or infiltration of the mastoid. No cords perceptible in the neck. Complains at times, but seems fairly free from pain. Vomited this morning after drinking milk. Thirst increased. An excessively fetid discharge from the right meatus, whose walls are somewhat diffusely infiltrated. The floor of the meatus covered with caseous pus. No polypi.

Operation under chloroform. Bone perfectly sound. At the depth of one half *cm* a cavity the size of a walnut, filled with fetid cholesteatomatous masses. These removed with the sharp spoon. The cavity extended upward about one and one half *cm*, reaching above the superior wall of the meatus, and lay partly in the medial cranial fossa, being bounded in part by the dura. After the cavity was opened up as extensively as possible and the cholesteatomatous masses removed with the sharp spoon, it was tamponed with iodoform gauze and a sterile dressing applied.

*June 3d.*—Temperature, A.M., 36°; P.M., 36.3°. Slept well after morphine. Pulse 90.

*June 5th.*—Yesterday noon and during the night severe chills, followed by fever and thirst. Temperature rose during the attacks to 41.1°. Between the attacks patient is quiet, does not complain of pain. During attacks, tosses about the bed, wailing. Temperature this A.M. 36.7°. Dressings changed. Wound looks well. Urine clear, acid, no albumen. Ophthalmoscopic and stethoscopic examinations negative. Ordered 20 centigrammes quinine three times a day.

*June 6th.*—Yesterday noon two severe chills within an interval of only one half hour. Patient much prostrated, no pain. Temperature 39.2°; yesterday evening, 40.4°. This morning had another attack. Is perfectly conscious. Sensitiveness to pressure in carotid region, where there are several slightly swollen glands, but no cord can be felt. In order to examine the transverse sinus, a piece of bone the size of a cent was removed from behind the mastoid wound. A large portion of the sinus was laid bare. Its wall, forward near the cholesteatoma cavity, markedly thickened, and hard to the touch, farther backward soft and elastic. No pulsation visible. The wall was opened with a pair of sharp-pointed scissors, but as violent hemorrhage took place, the wound was immediately tamponed with iodoform gauze.

Patient has felt well and has been free from chills until this morning, when he again had an attack.

*June 7th.*—Yesterday noon another attack. This morning very feeble and collapsed. Rectal temperature only 35.8°. Eats nothing, but drinks considerable milk. Became better during the day, and at the afternoon visit he was sitting up in bed and playing.

*June 9th.*—Temperature yesterday noon 36.5°; yesterday evening, 40.7°; this morning, 36.6°.

*June 10th.*—Taken with a rather severe moaning cough. Superficial and much accelerated breathing. Lessened resonance and fine crepitant râles over right infrascapular region. Temperature yesterday noon, 40.2°; last evening, 39.4°, this morning, 36.6°. Yesterday had severe chills. Continuous violent cough. Resonance diminished over nearly entire right side posteriorly. Respiration everywhere accompanied by loud râles. Abundant chlorides in the urine. Pulse 112.

*June 13th.*—Rapidly weakening. Frequent rigors.

*June 15th.*—Condition essentially the same. No infiltration in the superior carotid region. No cord-like feel to the vena jugularis.

*June 16th.*—Bandages changed. Wound granulating and looking well.

*June 24th.*—Growing weaker. Takes no nourishment with the exception of a little milk during the hot stage. Pulse 130, fairly strong. Auscultation unchanged.

*Jnne 26th.*—Violent rigors. Complains and moans continually. Is conscious, but very weak.

*June 28th.*—Absolute dulness on percussion over entire right side of the chest posteriorly. Respiratory sounds weakened. Exploratory puncture made in seventh intercostal space, with discharge of pus. Thereupon exsection of the seventh rib in anterior axillary line. (Dr. S. Saxtorph.) A quantity of frightfully fetid pus removed. Pleural cavity washed with sterilized water, and a drainage tube introduced. Given ether subcutaneously on account of threatened collapse.

*June 29th.*—Is very weak. Takes a little wine and strawberries. A quantity of bad-smelling pus is discharged through the pleural fistula, filling the room with a terribly offensive odor.

*July 9th.*—Appetite now quite good. Sleeps better at night.

Suppuration in pleural cavity markedly diminished and no longer fetid. Remains all day in the air on a veranda.

*July 18th.*—There has developed spontaneously on the right thigh (at the point of an ether injection) a foul undermined ulcer the size of a fifty-cent piece. Nights are restless. During day is fairly well. Now and then chills and thirst.

Not until the middle of August did these elevations of temperature cease.

*Aug. 29th.*—No fever. Appetite good. Has become stronger. Is up the entire day. Suppuration in mastoid has ceased. There is an opening behind the ear the size of a bean, its edges covered with epidermis. Within the mastoid there is a smooth-walled cavity the size of a nut, lined with epidermis, and connecting deep in with the meatus. No exudation from the middle ear. Pleural fistula is still open and secretes some pus. Bandages changed twice a day.

*Jan. 26.* 1891.—Pleural fistula closed and patient discharged well.

In *December*, 1892, the fact of a complete cure was authenticated.

*Summary.*—We have here to do with a case which is unfortunately not rare. A boy is taken in his earliest childhood with a discharge from the ear; this becomes chronic and fetid, but is notwithstanding left to itself. After several years, it occurs to those about him that possibly proper treatment might have some effect on the bad-smelling discharge. The examination discloses extensive destruction in the middle ear, with the formation of polypi. After the patient has been treated for some time, the polypi removed, and the suppuration probably reduced to a minimum and rendered nearly odorless, but before a complete cure has taken place, the treatment is suddenly discontinued. In a year and a half the old condition has returned, the polypi are again removed, and the patient again disappears, until finally the symptoms of critical complications of more general nature arise, the child has chills, accompanied by marked elevation of temperature and general deterioration.

Examination disclosed a fetid discharge from the right meatus, the floor of which was covered with caseous pus.

The mastoid region was perfectly normal, neither redness nor sensitiveness indicated the extensive trouble which, as discovered later, had its seat within.

The complete lack of pain, the clear consciousness and absence of cerebral symptoms, and the sudden elevations and depressions of temperature, all justified the diagnosis of pyæmia, whose origin must be sought for in the purulent breaking down of a thrombus in a vein in or near the middle ear.

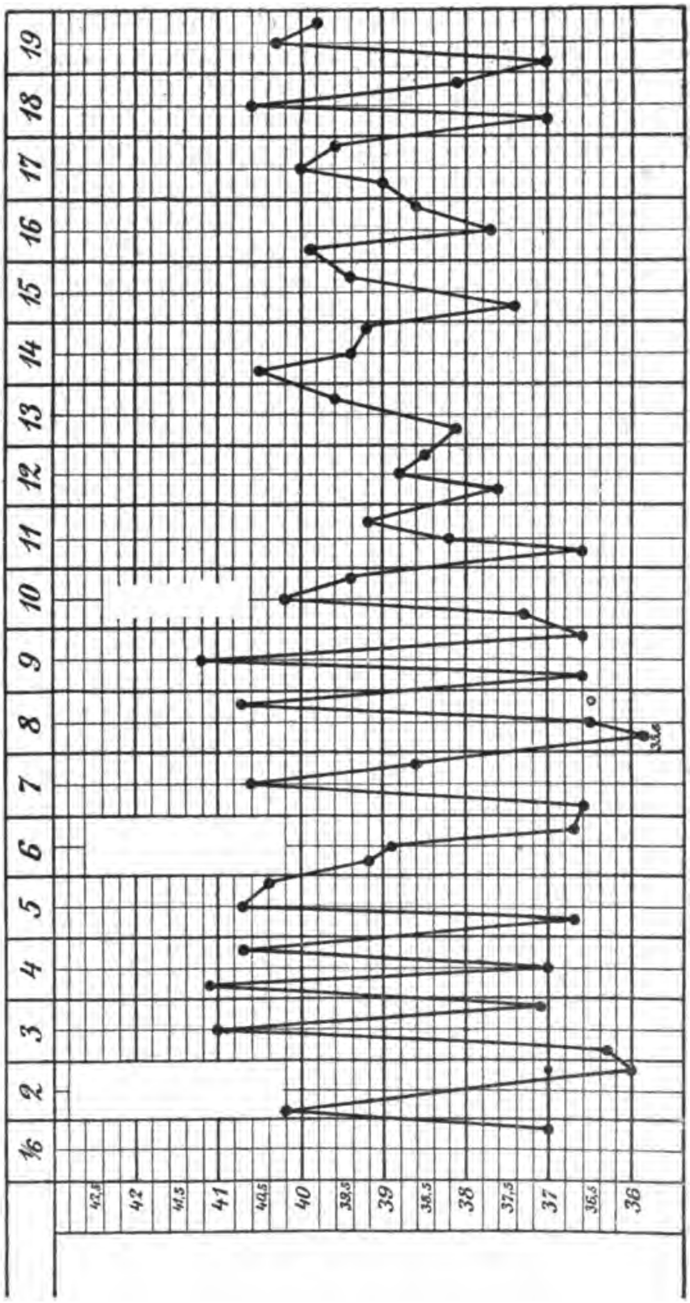
It is apparent that a stagnation of septic exudation somewhere in the middle ear must be the cause of this thrombophlebitis. Therefore the first task of the physician, under such circumstances, is to open up the cavities and provide free drainage. The boy was therefore taken into the hospital and the operation immediately performed.

To our great astonishment, after removing the sound cortical layer, we found a cavity as large as a walnut, situated partly in the middle cranial fossa, and filled with fetid cholesteatomatous masses.

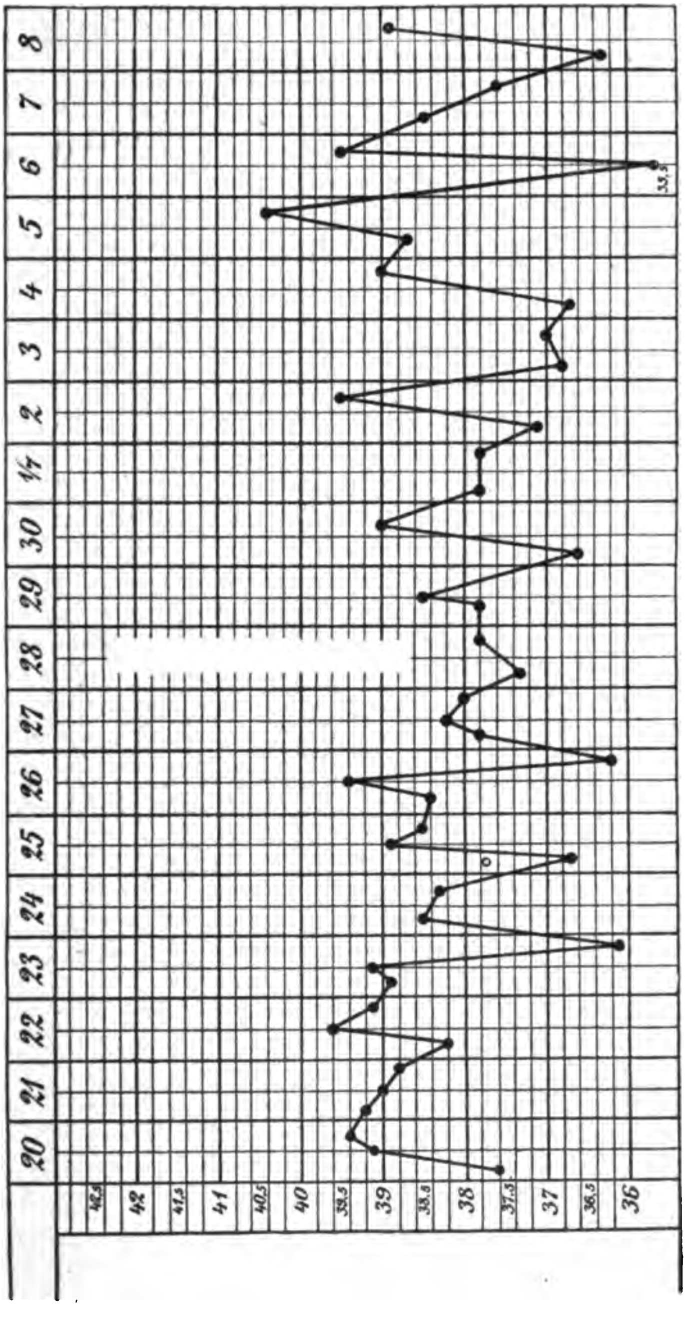
After all the diseased tissue was removed and the cavity tamponed with gauze, I hoped that the danger would be over, especially as the temperature fell immediately after the operation, and on the following evening and morning was still about 36°. This was, however, a vain hope, and the same marked temperature variations manifested themselves as before the operation (see temperature chart). The operation was performed on June 2d; on the morning of June 3d the temperature was 36.3°, at noon 41°, and in the evening 39.1°. June 4th, at noon it was 37°, and in the evening it rose again to 40.7°.

The patient had typical chills followed by fever. Between the attacks the child did not seem much affected. He lay quiet and cheerful and could laugh and play, although he was somewhat tired and did not take much nourishment.

As the disease maintained during the following days this pronounced pyæmic character, I concluded to see if possibly a phlebitis of the transverse sinus might be present. It is true the diagnostic symptoms of this trouble were absent, in that no collateral œdema of the mastoid region existed, and



Temperature Curve (Case II.).



Temperature Curve (Case II.) Continuation.

no thrombi of the internal jugular were to be felt in the neck. Still it was conceivable that the disease was so recent that thrombi had not had time to form in the internal jugular. It was also conceivable that the extensive cholesteatomatous masses in the mastoid had long before destroyed the emissary veins running from the transverse sinus to the outer surface of the cranium, and had thus rendered engorgement in the mastoid region impossible. The negative ophthalmoscopic examination was no sure proof of the non-existence of a sinus thrombosis, as post-mortem examinations have shown that a normal condition of the eye can easily be present in thrombosis of the transverse sinus.

My idea was that, in case there was a phlebitis of the sinus, the only hope of saving the child lay in finding it, removing the septic mass, ligating the jugular vein, and thus avoiding further infection. Therefore, four days after the mastoid operation, the sinus was laid bare and its somewhat thickened wall cut through, but fluid blood poured out in such amount that further operative procedures had to be given up.

The chills continued. Two days after the last operation the temperature was, in the morning, 35.8°, but rose again in the evening to 40.7°. When, on the eighth day, I found signs of a metastatic pneumonia, I looked upon the condition as hopeless. The vital powers rapidly diminished, and the boy emaciated to a skeleton.

Consciousness remained clear. The rigors recurred daily, but the variations in temperature were no longer so marked. The temperature seldom rose to over 39°, and often went down to 36°.

Seventeen days after the beginning of a pneumonia we found signs of an empyæma on the right side. The child was nearly moribund when the abscess was opened, and collapse was only averted by the subcutaneous injections of ether.

From now on the patient improved, slowly however during the first months, six weeks elapsing before he was without fever. The fistula did not close until six months after the operation.

Since this time he has been well, with the exception of being treated for a time for gummous ulceration in the pharynx and naso-pharynx, probably hereditary. The right middle ear, with neighboring parts, is represented by a large cavity lined with epidermis, which communicates with the exterior partly through a large opening in the mastoid, and partly through the meatus.

Contemplating such a case as the above, one naturally asks: How shall we treat a patient, who, during the course of an ear trouble, is suddenly taken with all the symptoms of pyæmia? The answer to this question depends naturally partly on the character of the pyæmia and partly on the nature of the ear disease. The milder forms of pyæmia are often observed during middle-ear suppurations, when the pus does not perforate the drum membrane, but the symptoms generally quickly cease with the discharge of the pus. In a relevant case described by Moos,[1] pyæmia developed in a young man of eighteen. It lasted ten days, and ended without causing metastases in other organs. Here operative treatment was not necessary, as the drum ruptured spontaneously.

In two acute cases observed by Schwartze,[2] the condition was much more critical. In one case a large abscess formed in the gluteal region, in spite of repeated paracentesis, but no secondary complications on the part of the mastoid followed. In the other case (man of twenty-five) the pyæmia lasted three months, and rendered the opening of the mastoid necessary. It caused a septic retinitis with retinal hemorrhages in both eyes, and an abscess on the left shoulder and upper arm, accompanied by great emaciation. After four and one half months a complete recovery with good hearing took place.

Free incision of the drum, repeated if necessary, and the opening of the antrum are the means at our command for avoiding pyæmic infection in acute cases.

Pyæmic conditions are, however, much oftener met with in the course of chronic otorrhœa.

---

[1] *Zeitschrift f. Ohrenh.*, xi., 238.

[2] *Arch. f. Ohrenh.*, xxvii., 288.

The clinical picture is here generally much more critical, and if the patient is left to himself the prognosis is very bad, as death generally results from metastatic infection of other organs.

The pyæmia is either caused by absorption from the middle ear, or is in consequence of septic phlebitis of the sinuses about the ear, especially of phlebitis of the transverse sinus. It is worth while to consider this circumstance particularly. For in case the septic mass is within the middle-ear area, the opening of the cavities of the middle ear will be sufficient to prevent further infection, and in case the organism can master the infectious matter already introduced, a cure can result without further interference.

Pronounced cases of this kind, cured by simply opening the mastoid, and metastatic abscesses when present, are mentioned in the literature of the subject. According to Grunert,[1] during the past year eleven cases of pronounced metastatic pyæmia were treated in Schwartze's clinic by simply opening the mastoid, and of these six, or fifty-five per cent., were cured.

Schmiegelow[2] and Hessler[3] have had similar experiences, each opening up a large epidural abscess. Moos[4] and Chatellier[5] have each described a case. There were no evident metastases in the case described by Moos, simply a cough with brownish expectoration; while that of Chatellier was complicated by an abscess of the left arm.

On the other hand, if the pyæmia is derived from a septic thrombus in the transverse sinus, a simple cleaning out of the cavities of the middle ear can have no influence upon the pyæmia. The only possibility of preventing further infection under these circumstances is to attempt to remove the diseased portion of the vein, and to cut off its communication with the rest of the vascular system. Zaufal stated this idea in 1880 and 1884, and proposed for this purpose the ligation of the internal jugular and the opening of the transverse sinus, which was thereupon to be filled with a disinfectant solution. This proposition was carried out practically by the Englishmen, Lane[1] and Ballance,[2] and later by Sulzer[3] and Parker.[4] Sulzer simply opened up the sinus and carefully removed the septic mass, while the rule is to first tie the internal jugular. This must be looked upon as a safe means of preventing further infection from the thrombus, though of course it could extend forward into the cavernous sinus and to the other side, rendering infection possible through the other internal jugular.

---

[1] Ref. in *Arch. f. Ohrenheilk.*, xxxiv., 153.
[2] *Arch f. Ohrenh.*, xxvi., 92.
[3] *Arch. f. Ohrenh.*, xxviii., 19.
[4] *Zeitschr. f. Ohrenh.*, xxi., 49.
[5] *Annales des Malad. de l'Oreille*, 1890, 164.

Lane operated upon three cases. One died and two recovered. In one case there was no thrombosis of the transverse sinus, and on opening it there was such marked hemorrhage that he ligated the internal jugular, after which the patient (a three-year-old child) collapsed, and he had to stop. The child eventually recovered. In the third case Lane ligated the internal jugular but did not open the sinus. Death, however, ensued from the spreading of the thrombus to the petrosal and cavernous sinuses.

Of the four cases operated on by Ballance, two recovered and two died, one from œdema of the glottis caused by a small abscess in the larynx, the other from a metastatic pulmonary trouble which had developed before the operation.

Of Sulzer's two patients, one recovered, after the discharge of fetid pus from the transverse sinus and the opening of an epidural abscess in the middle cranial fossa. The other patient died, in spite of the operation, of septicæmia and patches of lobar pneumonia.

One of the two cases operated upon by Parker recovered, while the other died with symptoms of meningitis. No post-mortem was made.

Finally, Jansen[5] cured a pyæmia by opening an extradural abscess, and incising a transverse sinus containing pus.

---

[1] *Brit. Med. Jour.*, May 4, 1889. *Lancet*, Sept. 26, 1891.

[2] *Lancet*, May, 1890.

[3] *Wiener klin. Wochensch.*, 1890, No. 34.

[4] Ref. in *Arch. f. Ohrenh.*, xxiv., 152, from the *Berliner klin. Wochensch.*, 1892, 214.

[5] Ref. in *Arch. f. Ohrenh.*, xxxiii., 298.

According to Jansen, in addition to the above, three incisions into the transverse sinus, with fatal results, were made during 1890–92 at the Berlin University clinic.

We have therefore fourteen cases of sinus trouble treated operatively, with the result that seven recovered and seven died. The causes of death were either endocranial complications, such as cerebral abscess, meningitis, extension of the thrombosis, or metastatic troubles in the peripheral organs, especially in the lungs.

These results necessitate the direction of our attention, in all cases of critical metastatic pyæmia, to the possibility of a septic sinus phlebitis. Consequently we dare not content ourselves with the simple opening of the antrum or attic, but must lay bare the sinus and, if necessary, open it and remove the septic thrombus, ligating at the same time the internal jugular. If an open sinus is found, as was in my case, I consider it incorrect to ligate notwithstanding the internal jugular, as Lane did in one of his cases. Such an operative procedure would be justified only if evident signs of a phlebitis of the internal jugular were present (a hard sensitive cord occupying the position of the vein in the carotid region).

In case metastases take place in the lungs, the general idea has been that the patient is certainly lost, and that one should abstain from useless operative interference.

Reinhard and Ludewig[1] express themselves as follows: "We believe that so long as no positive signs of metastases in the lungs are demonstrable, it is permissible and obligatory to proceed operatively. As soon, however, as these exist, as shown by cough with bloody expectoration, shortness of breath, etc., we will refuse to perform a useless operation, for it is then no longer possible to save the life of the patient."[1]

The fact that recovery took place in my case, in spite of all the signs of a pneumonia, and in spite of the enormous accumulation of pus in the pleural cavity, would seem to indicate that even under these circumstances one should try operative treatment, although this case, as far as the favorable result is concerned, must be considered exceptional.

---

[1] *Arch. f. Ohrenh.*, xxvii., 217.

**Appendix.**—Although it has been impossible for me to follow the history of the following case, nevertheless I think a case of sarcoma of the mastoid process possesses sufficient interest to be published notwithstanding this fact. For us the case is of especial interest, since the sarcoma brought about a paresis of the facial and hypoglossal, together with hemiatrophy of the tongue, so that the case had, in this connection, great similarity with the first one described above. I express my most hearty thanks to Dr. Ammentorp for his permission to publish the case.

### *III.—Sarcoma of mastoid process—Operation—Improvement—Later history unknown.*

Christianna P., eight years old. Admitted March 22, 1880. Discharged April 27, 1880.

*History.*—Healthy parentage; none of her near relatives have tuberculosis or tumor formations of any kind. Has had measles and pertussis; otherwise has always been healthy. During past summer had trouble in eating, in that the cheeks would get in between the teeth. In the fall a tumor behind the ear was observed, coming on after a bruise by a stone. This gradually increased in size, unaccompanied by pain or signs of inflammation. Fourteen days ago a physician incised the apex of the tumor, and let out some blood. Later there was a discharge partly of blood, and partly of a yellowish tenacious fluid. Eight days ago a slight bloody discharge from the left ear appeared. On pressure about the meatus, the pain radiates out over that side, and over the back of the head.

Child well-developed and nourished, skin normal. Behind the left ear a tumor 17 *cm* from before backward, and 13 *cm* in height. Its posterior edge reaches 2 or 3 *cm* beyond the middle line, forward it extends to the border of the basis maxillæ, over which it arches somewhat. The auricle is pushed upward and forward so that the auricle stands nearly perpendicular to the medial plane. Downward, the tumor reaches with its most anterior portion to nearly the level of the basis maxillæ infer., and rises in an oblique direction upward and backward toward the external occipital protuberance. The tumor is egg-shaped, markedly arched, and comes somewhat to a point about 4 *cm* behind the ear. The skin, normal to the touch, is stretched and very red; several subcutaneous veins visible. Over the extensive central portion the tumor is tense and fluctuating; at the borders, hard as bone, this hardness passing gradually into that of the os occipitis.

Strong pressure at some places elicits a feeling like that of crackling parchment. Very little sensitiveness; meatus is much compressed, its posterior wall has a perceptibly cartilaginous surface. Probing causes the discharge of some serous fluid. Hearing in the left ear is entirely gone. Neither from the mouth nor pharynx can a tumor be felt. The muscles of expression are paralyzed, the mouth drawn to the right, and there are other evidences of a marked facial paralysis. The left half of the tongue is atrophic. Taste absent on left side. Voice clear; deglutition normal. No swollen glands in the neck. Upper end of sterno-cleido-mastoid muscle appears to be stretched out over the surface of the tumor. In all other respects the patient's condition is perfectly normal. Pulse 120.

*March 25th.*—By means of a crucial incision, four flaps were formed. The sterno-cleido-mastoid and the fascia between this and the trapezius, as well as this latter muscle, were stretched out over the tumor. The tumor was laid bare down to the cranium, and its tension relieved by incision. It was cystic, degenerated, the cavities containing blood. The walls of the cavities consisted of periosteum and bone. Since the meninges of the cerebellum could be felt through a defect in the skull 3 *cm* long and 1½ *cm* wide, and the bare bone near the occipital condyle could also be reached through the cystic cavity, the walls of the same were cut loose above and behind. Part of the tumor in the retro-maxillary fossa was removed so that the ear went back into place. Some soft masses of the tumor were left near the ramus of the lower jaw. Only a few arteries were ligated. The cavity was tamponed with carbolized gauze and the flaps partly sutured together.

In the journal was further noted: The wound did well; there were slight elevations of temperature in the evenings, except during the first fourteen days.

*April 14th.*—Patient felt well; no fever; got up.

*April 24th.*—Cicatrization progresses nicely. Edges of the wound clean. No signs of recurrence.

*April 27th.*—Patient was discharged and travelled home.

*Microscopical Examination.*—The tumor is very vascular, and contains several cysts, varying in size and communicating with each other. The walls between these cysts contain isolated bone lamellæ and ridges of bone. Some portions of the tumor consist of connective tissue, with a few nuclei; other portions typify a small round-celled sarcoma.

# ON SYSTEMATIC PROCEDURE IN OPERATIONS FOR THE RELIEF OF INTERCRANIAL DISEASE SECONDARY TO EAR SUPPURATION.

### BY URBAN PRITCHARD, LONDON.

NEITHER in respect to the conditions for which the operations were undertaken, nor as to the results, is any particular novelty claimed for the following cases. They are, however, not unworthy of record as illustrating what I believe to be the correct method of procedure in *every* case in which surgical operation is undertaken for the relief of intercranial disease secondary to ear suppuration, viz.:

1. First thoroughly open the antrum, and explore the mastoid cells.
2. Failing to find sufficient evidence to account for the whole of the symptoms, the wound in the skull should be enlarged backwards so as to expose the middle and posterior fossæ above and below the lateral sinus, which should be explored by means of a hypodermic syringe. At the same time subdural abscesses may be carefully looked for.
3. If a clot be found in the sinus, the internal jugular vein should now be tied, and the sinus opened and thoroughly cleared of its contents.
4. If there is any suspicion of cerebral or cerebellar abscess, exploratory punctures may be made above and below the sinus, and the pus, if found, evacuated.

CASE 1 (from the *Lancet* of March 4, 1893).—A girl, aged thirteen, was admitted into King's College Hospital on November

5, 1892, with a history of having suffered from purulent discharge from the ears for some years. Eight days before admission earache and headache on the left side were complained of, together with pain on movement in the upper part of the neck on the same side. These pains gradually became very severe; vomiting was an early symptom; rigors developed, some two or three a day, and twitchings of the right leg were said to have been noted during sleep. On admission the patient was seen to be a well developed girl, very restless, but answering questions quite rationally. She complained of intense pain in the ear and in the side of the head, posterior to the ear, the pain extending down the neck. On examination the right ear appeared to be quite normal; the condition of the left ear was as follows: On mere inspection nothing appeared abnormal. Within an area of two inches and a half posteriorly to the pinna gentle percussion with the finger gave rise to pain, but not of an intense character. Pain of a more severe type was caused by digital examination of the upper part of the neck, which was then seen to be slightly swollen, but no fluctuation could be detected. The membrana tympani was dry, and the vessels accompanying the handle of the malleus were congested; there was no marked bulging. The watch was heard at a fairly normal distance on the right side, and at $\frac{8}{100}$ in. on the left. There was no optic neuritis. The urine had a specific gravity of 1009, and did not contain any albumen. Every other organ and viscus appeared to be quite normal. The temperature at 1.30, P.M., was 102°; pulse 116; respiration 44.

As the pain and temperature remained the same, it was decided to operate at 6.00, P.M., on November the 6th upon the following lines: (1) To chisel into the mastoid antrum; (2) if necessary, to open up the mastoid cells; (3) if nothing deemed sufficient to account for the symptoms could then be found, to chisel backwards and open up the lateral sinus. The patient was anæsthetized, the hair cut, the left side of the head shaved and purified by scrubbing with a nail-brush, soap, and a carbolic solution (1 in 20). The left external auditory meatus was syringed out with a carbolic solution of the same strength. A curved incision, two inches long, was made a quarter of an inch behind the pinna of the left ear, the periosteum detached, and the mastoid antrum opened by means of the chisel and mallet. On the first introduction of the chisel into the antrum gas bubbled out with the blood. The opening thus made was enlarged, during which process a few streaks of thick pus came away, but there was no distinct evacuation of any collection. Scraping with a sharp spoon only removed old cheesy degeneration without offensive odor, and it was thought that so far the cause of the severe symptoms had not been revealed; it was, therefore, determined, to examine the lateral sinus. An incision was accordingly made backwards from and at right angles to the preliminary cut. The opening in the skull was enlarged upwards, backwards, and downwards. More cheesy matter was scraped away, and as the dura mater, covering the temporo-sphenoidal lobe, bulged considerably into the upper part of the aperture, this membrane was opened, and a carefully purified exploratory needle was passed into the brain substance in search of pus, but with no result; the incision into the dura mater was accordingly reunited with a fine catgut suture. After a little more chiselling the lateral sinus was completely exposed. Into it the purified needle of a hypodermic syringe was inserted, but no blood or pus could be drawn up, and on withdrawing the needle it was found to have a very offensive odor. The outer wall of the sinus was next thoroughly opened by a longitudinal incision, and, on scraping out the contents, fetid gas bubbled up. A probe was then thrust upwards towards the torcular Herophili, and downwards towards the internal jugular vein, but no blood could be made to flow, and on withdrawal the probe had a most offensive odor. The next step was the ligation of the internal jugular vein, and an incision was made from the angle of the jaw to the cricoid cartilage, but, on account of the matting together of the enlarged and inflamed glands, this incision had subsequently to be enlarged. The vein, when exposed, appeared to be collapsed; it was tied in two places, and divided between the ligatures. The operation had already lasted two hours and a half, so it was thought desirable to finish as quickly as possible. The lateral sinus was again scraped with a sharp spoon, and syringed out with a solution of perchloride of mercury (1 in 3000), in the hope that by these means the original source of infection would be removed. The temperature at midnight was 97.4°; pulse 140; respiration 44.

*Nov. 7th.*—The pain has subsided; there has been no vomiting or rigors. She takes nourishment well, and feels much better. Urticaria over the chest and the arms was noticed this morning. The temperature during the day remained slightly under the normal. The pulse fell from 136 at 4 A.M. to 96 at 10 P.M., and the respiration from 40 to 32 respectively.

*8th.*—At 6 A.M. the temperature was 102.2°, and at 10 P.M. 101.6°. Except for the temperature, the condition continued much the same as yesterday.

*9th.*—The temperature at 10 A.M. was 101°, at 2 P.M. 103.4°, and at 4 P.M. 103.6°. At 4 P.M. Dr. Pritchard decided that as the temperature was gradually rising the internal jugular vein should be dissected out and the opening in the skull enlarged. The patient was again anæsthetized, and as Mr. Cheatle had performed the preliminary operation Dr. Pritchard requested him to undertake the second. The horizontal incision above described was prolonged a little backwards, and the opening in the skull was enlarged, particularly in a backward and downward direction, where the dura mater had become separated from the skull, and where, too, a dependent position for drainage could be best obtained, and the burrowing of inflammatory material towards the cerebellum prevented. (During the performance of this part of the operation the facial nerve must have been injured, notwithstanding the care taken to avoid this accident.) The lateral sinus thus further exposed was laid open, the clotted offensive contents scraped out with a sharp spoon, and the outer wall entirely removed, so that the sinus was practically obliterated. The upper end of the sinus was allowed to bleed for a few seconds in order to clear away as much as possible the remaining offensive clots; hemorrhage was easily controlled by light pressure. The wound in the neck was then reopened and the internal jugular vein dissected out as far as possible in the direction of the skull. A solution of perchloride of mercury (1 in 2000) was syringed from the remains of the sinus through the remnant of the internal jugular vein into the wound in the neck; much offensive clot came away during this process. The wound in the neck was sutured and the whole dressed with cyanide gauze. At 7.15 P.M. the temperature was 97°, at 10 P.M. it had risen to 99°. The patient slept during the night.

*10th.*—The temperature at 6 A.M. was 100°, at 10 P.M. 99°.

*11th.*—The temperature at 6 P.M. was 98.6°. The wound, which had been dressed daily, looked healthy. The patient suffered no pain and looked and felt quite well. This continued until noon of Nov. 12th, when the child had a rigor, with a temperature rising to 104.2°. This was found to be due to a collection of discharge in the resutured cervical wound; the stitches were accordingly cut and the wound opened up. On the afternoon of the following day the temperature reached 103°, from which point it steadily declined, and by Nov. 20th it became normal and did not subsequently rise. The long wound healed from the bottom, there were no further bad symptoms, and the patient was sent to a convalescent home on January 27, 1893.

*Remarks* on CASE 1.—In this case it remained a matter of doubt whether the general septic infection was from the clot in the posterior part of the lateral sinus, close to the torcular Herophili, or to that in the jugular vein. I could not help thinking that it was due to the former, for the vein was occluded in the first operation. A point of surgical interest was the ease with which slight pressure arrested the flow of blood from the sinus after the scraping. But by far the most important point was the power of surgical interference in saving the life of the patient, even although the septic disease had so far advanced that the thrombus in the sinus had broken down, and there were fetid gases in the vein; no doubt the excellent general health of the patient was an important factor in the result.

CASE 2.—T. C., a male, aged twenty-six, was admitted into King's College Hospital on February 14, 1893, with the history of discharge from his ears for nine or ten years, but prior to the present illness there has not been any pain. On the morning of Feb. 11th, after a heavy drinking bout, he complained of severe pain in the frontal region, and vomited once or twice during the night. On the 12th, he complained of giddiness, was more or less delirious, and is said to have had three "fits" in the course of the morning; in the afternoon he was seen by a doctor, who found him drowsy, but answering questions quite sensibly, and complaining of pain in the region of the right ear; there was no œdema over the mastoid, the tongue was furred, the bowels constipated, temperature 104°. Ordered a purgative and lotio acidi boracis for syringing out the ear.

On the 14th, before admission, had three definite rigors, the temperature rising to over 104° on each occasion, and he complained a good deal of spasmodic abdominal pain.

On admission was found to be a healthy, well nourished man. Was in a restless, dazed condition, quite unable to give a coherent account of himself; complaining of pain in the head and around his right ear, and especially of intense and persistent abdominal pain, which became worse at times. Tongue furred; lungs, heart, and urine normal; no optic neuritis; nothing to be made out in the abdomen except that the pain was relieved by pressure. Temperature 99.4°.

The pinna of the right ear was normal in position and appearance; there was no redness, swelling, pain or tenderness over the mastoid; the external meatus was blocked with pus and cerumen, removal of which revealed a polypus growing from the upper and posterior part of the meatus, deep down. The left ear showed signs of old suppuration, but nothing acute. The polypus was removed by torsion and its base curetted, and the meatus syringed out with a solution of carbolic acid 1:40.

*Feb. 15th.*—General condition about the same; abdominal pain still continues; temperature normal.

*Feb. 16th.*—Morning temperature 99.2°. Evening 100°.

*Feb. 17th.*—Temperature at 8.45 A.M. 101°, at 10.15 A.M. 103°; fell to normal at 4 P.M. General condition remains the same.

*Feb. 18th.*—At 3 P.M. the temperature again arose to 103°; at 11 P.M. as the patient appeared worse an operation was decided upon.

The patient having been anæsthetized and a sufficiently large surface of the right side of the head having been shaved and purified, a vertical incision was made close behind the auricle, and the bone being bared the mastoid process was carefully chiselled away in the direction of the antrum. The bone was found to be sclerosed throughout, and a depth of about an inch was reached without coming upon the antral cavity, and a little deeper and the cranium was opened. It was determined to open the cranium freely and explore the lateral sinus before proceeding farther in search of the antrum. The original incision was converted into a T-shaped one by means of a horizontal cut extending backwards and a large surface of the skull was thus exposed. The opening in the cranium was enlarged in the same direction by means of the chisel, and the lateral sinus freely exposed; in the course of this proceeding, a *small extra-dural abscess was opened up*, containing about a drachm of very fetid pus. This abscess was situated in the groove of the lateral sinus, and the bone in its immediate neighborhood was roughened.

The sinus was obviously filled with fluid blood, as the effect of respiration upon it was very marked; however, to make certain, the purified needle of a hypodermic syringe was introduced into it, and a small quantity of healthy blood, free from offensive odor, was withdrawn. Another purified needle was then introduced horizontally into the substance of the cerebrum, but no signs of pus were discovered. Chiselling forward and inwards at the site of the original skull opening was now resumed, and at a depth of 1¼ inches from the outer surface of the mastoid process the antrum was reached and was freely syringed out. The wound was dressed with iodoform and filled with cyanide gauze. The operation lasted three hours, the first part was performed by myself, the latter part by Mr. Lenthal Cheatle.

For the two following days the temperature remained normal; all pain in the head ceased and that in the abdomen decreased; there was so little shock or discomfort that the patient urgently requested to be allowed to become an out-patient.

*Feb. 21st.*—Temperature rose to 99.4°.

*Feb. 26th.*—Granulations were seen growing from the site of the old polypus.

*March 1st.*—The granulations having increased so as to obstruct the free passage between the wound and the external meatus, the patient was again anæsthetized, the polypoid growth thoroughly removed, and the antrum, tympanum, and meatus converted into one cavity by chiselling away the upper part of the posterior wall of the meatus. After this the patient made an uninterrupted recovery, and was made an out-patient. There is still some discharge from the enlarged tympanic cavity, but this is steadily but slowly diminishing.

*Remarks* on CASE 2.—In its general aspect, this is a contrast to the former case, inasmuch as the intracranial mischief was in its earliest stage, while in Case 1 it was in its latest. The first point of interest was the reflex abdominal pains, which were so marked as to delay the operation lest something beyond the meningitis should develop. As regards the operation itself the depth at which the antrum was situated, 1¼ inches, was a serious complication, as it rendered the operation so tedious. The great relief from pain was only to be expected, but the absence of shock after three hours' chiselling was remarkable.

CASE 3.—J. T., a boy aged five years; admitted into King's College Hospital on June 12, 1893, with a history of otorrhœa in infancy, but no discharge from the ear from that time to the present attack a week ago. On June 2d, without assignable cause, complained of pain in the right ear; this was quickly followed by discharge from the ear, vomiting, and great thirst, and these symptoms have gradually intensified. On admission was seen to be a delicate-looking boy complaining chiefly of pain on the right side of the head; he was restless and answered questions vaguely. Temperature 105°, pulse 100, respiration 44. A trace of albumen in the urine. On examination the left ear was found to be normal. The right ear was in the following condition, viz.: Pinna normal; meatus blocked with pus; intense tenderness over the mastoid region. No optic neuritis. The history of the attack, the high temperature, and the intense tenderness were held to indicate the necessity of immediate operation, which was performed by Mr. Lenthal Cheatle.

The same method was adopted as in the two former cases. The mastoid cells were spongy and full of pus, and on opening into them, nearly a teaspoonful of thick offensive pus sprang out, and from the condition of the adjacent parts it was apparent that this collection must have lain between the upper part of the lateral sinus and the dura mater. Exploration of the lateral sinus yielded only negative results. The dura mater over the temporo-sphenoidal lobe bulged forward in a suspicious manner, an exploring needle was therefore passed into the centre of the bulging membrane and offensive pus found. The dura mater was then opened by a vertical incision and the pus from an abscess about the size of a walnut was evacuated, and a great deal of highly offensive and necrosed tissue was removed by means of a sharp spoon. A drainage tube was inserted, the parts covered with purified iodoform, and the whole was dressed with cyanide gauze. After the operation the temperature fell to 98°.

On dressing the wound on the following day the ulcerated surface of the lateral sinus came away on the dressing; the loss of blood, however, was but slight as the hemorrhage was easily controlled, temporarily by the index finger, and permanently with a plug of cyanide gauze. Temperature normal; less delirium; better in every way.

*June 14th.*—Temperature 104°. General condition much the same as before the operation. Exploration of the lateral sinus drew off only normal blood.

*June 15th.*—There was considerable hernia cerebri. The drainage tube had been pushed out, and the little finger inserted into the aperture in the dura mater entered a cavity that had obviously increased in size since the operation. Gentle pressure was applied over the hernia and the parts dressed as before.

*June 17th.*—Very delirious, noisy, and incoherent; complexion gray, conjunctivæ yellow, bile in the urine. General condition suggestive of infection from the wound.

A needle introduced into the sinus again only yielded normal blood, nevertheless it was resolved to tie the internal jugular vein, and this was accordingly done, at a spot just above the level of the cricoid cartilage. In the evening there was a marked improvement in the condition; temperature normal, quieter, taking food.

*June 18th.*—Improvement maintained, temperature still down.

On the evening of June 19th the temperature rose to 101°, but without exacerbation or renewal of the other symptoms of distress; these latter, however, gradually appeared, the temperature rose higher and higher, and the boy eventually died on June 29th, with all the old symptoms of exhaustion. Unfortunately no post-mortem could be obtained.

*Remarks.*—In this case the disease was very acute and apparently every extensive. The rupture of the weakened wall of the lateral sinus and the facility with which the hemorrhage could be controlled by pressure so slight as not finally to obliterate the vessel, was a point of practical interest. The marked, though temporary, improvement in the general condition which followed the ligature of the internal jugular vein is worthy of note.

It is somewhat remarkable that in none of the cases here recorded were there any signs of optic neuritis, showing, I think, that a very serious condition may exist without this important sign being present.

Referring now in detail to the several steps in the method of operating which the above cases serve to illustrate:

1. In the majority of cases recorded, at least in those recently published, no reference is made to the ex-

ploration of the mastoid cells and the opening of the antrum. I think myself, however, that this is a point of prime importance and should always be insisted upon. If neglected, the surgeon is apt to leave untouched the very origin of all the mischief, and if this does not prove fatal to the immediate success of the case, there is always the danger of subsequent reinfection.

2. In enlarging the wound of the skull I prefer to use the chisel and mallet; Hoffman's gouge forceps are also of great assistance; if the trephine be employed care should be taken that the trephine opening should be made continuous with the antral opening so that the intermediate point should not be missed. The great point, however, in this step of the operation is to expose the lateral sinus and the dura-mater immediately above and below it, as by this means we obtain access to both the middle and posterior fossæ of the skull, and can thus explore both the cerebrum and cerebellum if necessary. In the course of this proceeding, careful search should be made for collections of pus between the dura-mater and the bone, and if any extensive extra-dural abscess be found, the cranial opening must be enlarged.
3. In the event of a thrombus being found in the sinus, the spot chosen for tying the internal jugular vein should be one well below any clot that may be felt in the vein itself, and it may be advisable to dissect out a length of the vein. The sinus should be freely opened and the contents thoroughly removed by means of the syringe, sharp spoon, etc., free bleeding from the upper end of the sinus being encouraged; this bleeding can readily be checked by plugging, when once we are assured that the contents of the sinus have been evacuated.

In many, if not in all cases, in which a cerebral abscess has resulted from middle-ear disease, the formation of such an abscess has been preceded by a certain definite chain of pathological events, such as subdural abscess, clotting of the sinus, etc. If, then, the surgeon does not proceed in the systematic and methodical manner suggested above, but prefers to trephine at once over the seat of the supposed cerebral mischief, there is every probability that one of the links of the chain may be overlooked. The primary source of infection still remaining uncorrected, not only is the success of the operation rendered extremely doubtful, but the patient, even if he recovers is always liable to similar attacks, any one of which may eventually prove fatal.

Finally, it should never be forgotten that even if nothing is found to account for the grave symptoms, the operation itself, involving as it does removal of bone and considerable local depletion, will in a fair proportion of cases arrest the symptoms, the patient making a good recovery.

In preparing the notes of these cases for publication, and more particularly in the treatment of the cases themselves, I have had the advantage of the assistance of Mr. G. Lenthal Cheatle, F.R.C.S., assistant surgeon to King's College Hospital. In the first and third cases, Mr. Cheatle himself performed the operations, in the second case we both took a share of the work.

# SOME REMARKS ON THE ANATOMICAL POINTS CONCERNED IN THE STACKE OPERATION.

By SAMUEL ELLSWORTH ALLEN, M.D., CINCINNATI.

I AM prompted to make the following statements by the perusal of an article which appeared in the last issue of these ARCHIVES (vol. xxii., No. 4), entitled "The Stacke Operation for Caries Involving the Middle Ear," etc. It is impossible for any one acquainted with the author's skill and ability, to criticise him as an operator. From an anatomical standpoint, however, his article is vulnerable. I can the better criticise his anatomical conclusions because I fell into the same error when preparing specimens for my monograph on the mastoid operation. I made a great many of what I considered horizontal sections of the temporal bone. That is, I took the disarticulated bone and, holding it upright in a vise, cut sections horizontal to this position. Such sections are shown in Politzer's *Zergliederung des Gehörorgans*, pp. 47 and 48, and in other anatomical works. As the bone is situated in the skull, however, such sections are far from horizontal. Similar points of the auditory canals on each side are in the same horizontal plane, and all planes passing through the temporal bone to be horizontal must be parallel to this plane. Operations are performed upon the bone *in the skull*, and to the operator *downward* and *upward* mean perpendicular to this plane, and not to a horizontal plane arbitrarily established upon the disarticulated bone. The *topographical* anatomy of the bone should be studied on truly horizontal and vertical sections. The horizontal plane, established by Dr. Holmes on the section represented in

Fig. 5 (see Dr. Holmes's article), is not horizontal at all, but runs inward and *upward.* A horizontal plane, started 2 *mm* above the centre of the external auditory canal, would pass below the cochlea and internal auditory canal, as may be seen from the figure in the ninth edition of Quain's *Anatomy*, page 430, where the bone is represented in its natural position. I am satisfied that truly horizontal and vertical sections, passing just over and just behind the meatus, are the best adapted to display the surgical anatomy of the bone. These are particularly fit because the horizontal section opens up the horizontal semicircular canal and the vertical one the facial canal. (Such sections are shown in Plates II. and III. of my monograph.) I make these statements regarding the true horizontal plane because I have criticised Stacke where he says that a certain cleft, about which I shall speak more fully, cannot be widened downward, and because Dr. Holmes takes exception to this criticism. *Downward* on a true horizontal section is a very different direction from *downward* on a section running inward and *upward.* Downward is vertical to a horizontal plane, if this plane is made to tilt inward and upward; then downward becomes downward and *inward.* To one looking at such sections as are represented in Fig. 5 (Dr. Holmes's article), a *true* vertical direction would be represented, not by a line perpendicular to the plane of the section, but by one passing upward and *inward.* False horizontal planes give us a wrong idea of the relative positions of the various parts. Take this same Fig. 5, facial canal, represented by *x*. Here the facial canal is seen to be in the posterior wall of the meatus. When it is said that bone can be removed *downward* from a point on the innermost portion of the upper edge of this posterior wall, the conclusion is inevitable that this can only be done by opening up the facial canal as we descend. Looking at the section and imagining the vertical course of the facial canal, we make this course perpendicular to the false horizontal plane, and therefore conceive its uppermost portion to be much farther outward than it really is. The facial canal at the top of its vertical course is *under* the forward and outward portion of the curve of the horizontal semicircular canal, and ***medial*** to the convexity of this curve. It is therefore in the petrous portion of the bone and not in the posterior wall of the meatus. As it ascends from the stylo-mastoid foramen it leaves more and more the region of the posterior wall. Low down, it is posterior and lateral to the tympanic cavity, varying in its proximity to the posterior wall; high up, it is entirely within (medial to) the medial wall of the cavity of the neck of the antrum. The facial canal is here ***vertical***; it cannot be, therefore, in any part of this portion, nearer the surface (farther lateral) than a perpendicular plane passed tangent to the tuberosity of the horizontal semicircular canal. True horizontal sections show that the horizontal semicircular canal (external portion of the curve) is farther outward than the facial canal. A perpendicular plane let fall tangent to the tuberosity formed by the semicircular canal would strike the plane of Dr. Holmes's Fig. 5, external to *x*. This same Fig. 5 is a very schematic representation, because the relative positions of the horizontal semicircular and the facial canal do not admit of the former being opened longitudinally and the latter transversely, by a common sectional plane, as is here shown.

For the surgeon there are practically three cavities connected with the tympanum. Considerable confusion arises in descriptions of these parts owing to the fact that anatomists have given us but two names for these three cavities. There is the attic, correctly described by Dr. Holmes as "the space located above the tympanum, within which are contained the body and short process of the anvil and the head and neck of the hammer. The floor of this cavity is about indicated by the course of the chorda tympani nerve." Then we have the antrum, and between these two there is this third cavity, which I have called the neck of the antrum. Stacke in his writings speaks of it as the ***aditus ad antrum***, a very good name, but one which has, unfortunately, been applied by some (Bezold) to the attic proper.

In Dr. Holmes's article a passage from Stacke is translated thus: "Deep in, however, there still remains below a ridge between canal and antrum; and on a level with the aditus the width of the cleft is regulated by this ridge of bone. Should we *at this point* attempt to *widen the attic downward,* Injury of the facial would be unavoidable." As can be readily seen from a perusal of his original article (*Berl. klin. Wochensch.*, Jan. 25, 1891) Stacke recognizes three cavities, the attic, the aditus, and the antrum. In this passage the word *attic* does not appear at all. What Stacke really says is: "Should we at this point attempt to widen the *aditus* [not attic] downward," etc. The same word is used by Stacke here as is used earlier in the passage when he says: "And on a level with the *aditus* the width," etc.

Dr. Holmes translates this word (*aditus*) correctly in the first part of the passage, and deliberately changes it into *attic* in the latter part, and emphasizes the mistake by putting the word in italics. He credits Stacke with an absurd remark according to his own definition of attic. If the attic is *above* the tympanum and its floor is represented by the course of the chorda tympani nerve, where is there anything to widen downward? There is no floor to the attic except a small portion of the superior wall of the meatus, over which the upper part of the attic extends. That Stacke does not use the words aditus and atticus synonymously is clearly evident from his article.

What are the boundaries of this aditus, this neck of the antrum, which Stacke says it is so dangerous to attempt to widen downward? Above it is bounded by the tegmen tympani, medially by the tuberosity of bone formed by the horizontal semicircular canal, and above this by cancellated bone, laterally by the inner edge of what we may call the upper-back wall of the meatus. The floor of the aditus is formed by cancellated bone. The upper portion of the narrow posterior wall of the tympanum bends sharply backward (backward and outward) and becomes the floor of the *aditus* (neck of the antrum), and continuing downward and backward passes into the floor of the antrum.

Supposing we have made the ordinary Schwartze opening into the antrum, and then wish to practise the Schwartze-Stacke modification. To do this we have now to cut away the wedge-shaped bridge of bone which remains between the meatus and the antrum—artificial canal. Dr. Holmes says: "We now begin to cut away the wedge, exerting great precaution when removing the last portion, which forms part of the outer wall and floor of the attic." The innermost portion, the apex of this wedge of bone, is the outer wall of the aditus (neck of the antrum), and not the "outer wall and floor of the attic." In taking away the wedge we do remove a portion of the superior wall of the meatus, and inasmuch as we do this do we take away the outer and small lower wall of the attic. That this is not what Dr. Holmes means by "outer wall and floor of the attic" is evident from the fact that later on he speaks of the removal of the superior wall as a separate step.

After removing this wedge, which we have done by having the upper line of cut pass directly inwards and the lower line inwards and upwards, there is a ridge of bone formed by what is left of the posterior wall of the meatus. This ridge, as Dr. Holmes says, increases in height as it approaches the middle ear. At its innermost portion it passes into the floor of the neck of the antrum (aditus, Stacke). According to Stacke: "So much of the posterior wall can be removed laterally that the lower wall of the external canal can pass uninterruptedly into the lower wall of the antrum." (In Dr. Holmes's translation antrum is printed attic.)

"Deep in, however, there remains a ridge of bone between canal and antrum." This ridge is of course formed by what has been left standing of the posterior wall of the meatus. At the level of the aditus, this ridge passes into the floor of that cavity. Stacke then goes on to say: "Should we at this point (at the floor of the *aditus*) attempt to widen the *aditus* (not attic, as Dr. Holmes translates it) downward, injury of the facial would be unavoidable." (Parts in parentheses are mine.) The facial canal lies farther inward than the horizontal semicircular canal, the tuberosity of which forms the *inner* wall of the neck of the antrum (aditus). How, then, can lowering the floor of the *aditus* hurt the nerve?

Lowering the floor of the aditus and with it the innermost portion of the ridge, widens the communication between meatus and antrum *deep in*, and gives much freer access to those cells which lie over the semicircular canal and in the medial wall of the antrum, and is therefore of great benefit in the after-treatment. In cutting the ridge *directly downward* we do not touch the lower portion of the posterior wall of the meatus *deep in*; such a vertical line falls outside or lateral to this portion, and does not, therefore, come near the facial nerve. The erroneous idea that such a removal of bone endangers the facial canal probably arises from the study of sections which are not horizontal, and hence it has been impossible to realize how far outward the semicircular canal is. Here is what Dr. Holmes says about removing this ridge: "We can with safety obliterate this ridge up to within 10 *mm* of the annulus tympanicus, measured along the lower and posterior portion of canal; beyond this part (medialwards) we encounter a dense, rounded ridge of bone curving forward over the oval window, and forming a part of the floor of the attic. This ridge, throughout its course, encloses the facial nerve, and within the part curving over the window is also harbored the horizontal semicircular canal, which must, of course, not be injured." This passage is exceedingly inaccurate and loosely worded. The word ridge occurs twice, the first "ridge" means the portion of the posterior wall of meatus left standing after removing the wedge; the second "ridge" refers to the tuberosity formed by the horizontal semicircular canal, which is erroneously said to contain the facial nerve and to curve forward *over* the round window. In what follows, including his translation of Stacke and his criticism of my compilation, Dr. Holmes seems to have confused these two ridges, and to have thought that both Stacke and myself were speaking of the ridge containing the semicircular canal (supposed by Dr. Holmes to contain the facial canal), and not of what we both meant by ridge, namely, the portion of the posterior wall left standing. In no other way can I explain his words: "In other words, it would be dangerous at this point to attempt to widen the passage by chiselling away a portion of the aquæductus Fallopii," etc. Dr. Holmes must have removed the cancellated bone overlying the horizontal semicircular canal, bone which is in the medial wall of the aditus, then of course the tuberosity of bone formed by the semicircular canal becomes part of the artificially enlarged aditus. Should one attempt to widen this cleft (between tuberosity and tegmen tympani) downward, it could only be done by cutting through the semicircular canal and afterward opening the facial canal. This is however not the cleft about which Stacke speaks. He would not have said that it was dangerous to the *facial* canal to widen downward a cleft the floor of which was formed by the *horizontal semicircular canal.* Stacke's cleft deep in lies between the true floor of the aditus and the tegmen tympani, and the tuberosity of bone formed by the semicircular canal is in the medial wall of the cleft. That this is what Stacke means is perfectly evident from his article. The removal of the posterior wall converts tympanum, meatus, aditus, and antrum into one large cavity. Stacke says the medial wall of this cavity is formed by the medial walls of the tympanum and attic, and by the aditus which is now a furrow running into the antrum (nun als Halbrinne in das Antrum mündenden Aditus). The aditus is a furrow and not a canal, because its lateral wall has been removed in taking away the wedge. After removing the wedge there remains a ridge of bone between meatus and antrum, and at the level of the *aditus* the width of the cleft (opening of communication between meatus and antrum) is limited by the same. (Stacke.)

" Now," says Stacke, and this is the point of contention, " should we at this point seek to widen the *aditus* downward, wounding of the facial would be unavoidable." *The floor of the aditus is external to the facial canal, and can be lowered downward without harm.* This is the criticism of Stacke which I made in my monograph, and this is what Dr. Holmes criticises in his article. I am found fault with for being too free with the chisel on the posterior wall, and then, in winding up his remarks, my critic says: " Besides, I see no occasion for running risks of injuring such important parts, for I have not found any difficulty in obtaining sufficient room for inspection and treatment of the antrum and attic when *all of the posterior* (italics mine) and a portion of upper wall of external canal (pars ossea) has been removed." *When all of the posterior wall has been removed!* Taking away *all the posterior wall* is a procedure more radical than I ever thought of. How this sweeping sentence contradicts all that has gone before! Dr. Holmes has told us that the ridge (portion of posterior wall left standing after removing the wedge) can be obliterated up to within 10 *mm* of the annulus tympanicus, measured along the lower and posterior portion of canal; and here he claims to remove *all* the posterior wall.

In a footnote I find the following criticism of Plate VI. (my monograph): "If the drawing Plate VI (Allen's book) is correct, he has removed even less of the ridge between antrum and external canal than Stacke recommends." In this passage Dr. Holmes has a correct understanding of what Stacke meant by ridge. One of the bewildering things about this entire article is that Dr. Holmes correctly defines parts, and then subsequently makes statements which, according to his own definition, are absurd.

On the bone from which this Plate VI was made, all the posterior wall of the meatus lateral to a vertical plane tangent to the tuberosity of the semicircular canal has been removed. The floor of the meatus on this specimen passes uninterruptedly into the antrum—artificial canal cavity. The main portions of the antrum and aditus are, however, *farther outward* than the lower portion of the posterior wall, and this part of the wall is left standing. There is no necessity for removing it, and it could not be done anyhow, because the facial canal is situated within this portion of the posterior wall, or just posterior to it. This lower portion of the posterior wall is, however, and this is the point, medial to the antrum and aditus, is farther *inward* than the main portions of these cavities. The vertical ridge which shows in my plate has been artificially formed in cutting down the posterior wall from a point on the innermost edge of the floor of the aditus.

In closing these rather random remarks let me again emphasize the fact that if we wish to get at the true relation of parts of the organ of hearing to the surface, we must make sections which are truly horizontal. If the anatomy is studied on such and on vertical sections no difficulty will be experienced in properly locating the important parts.

# PURULENT OTITIS MEDIA LEADING TO CARIES OF THE TEMPORAL BONE, EPIMENINGEAL ABSCESS, AND DEATH, WHILE THE MASTOID PROCESS REMAINED INTACT.

BY GEO. REULING, M.D., BALTIMORE.

(*With two figures in the text.*)

On the 11th of June, 1892, Wm. H. Thomas, aged fifty-seven, entered the Eye and Ear Department of the Maryland General Hospital, with the following symptoms:

Over the whole right half of his head he complained of headache, lancinating pains toward the right eye, lower jaw, and muscles of the neck. This headache was greatly varying in degree, sometimes so violent as to cause nausea and vomiting, and then again only slightly felt as a so-called dull headache of uncertain localization, but never was his head free from pain. From the external auditory canal of the right ear, a thin and very spare watery discharge was oozing. The otoscopic examination revealed a largely perforated drumhead, the promontory covered with pale granulations. On probing beneath the granulations, a rough, corrugated bone-surface could be felt. The Eustachian tube was free. Upon pressure of the mastoid bone, very little if any sensitiveness was observed; the region of the mastoid was not swollen, doughy, or red, neither was the auriculum abnormal in its position. The region of the fossa glenoidalis was occupied by a small, hard, lymphatic gland, which was painful on pressure; the movements of the lower jaw were, however, normal. No sign of a facial paresis existed. The man had been making the rounds of the different ear-dispensaries of the city during the last two years, where treatment was apparently only directed for his otorrhœa.

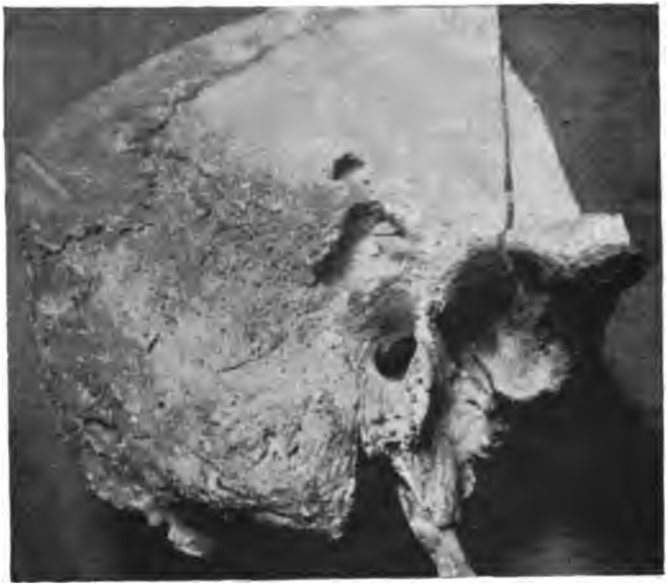


FIG. 1.

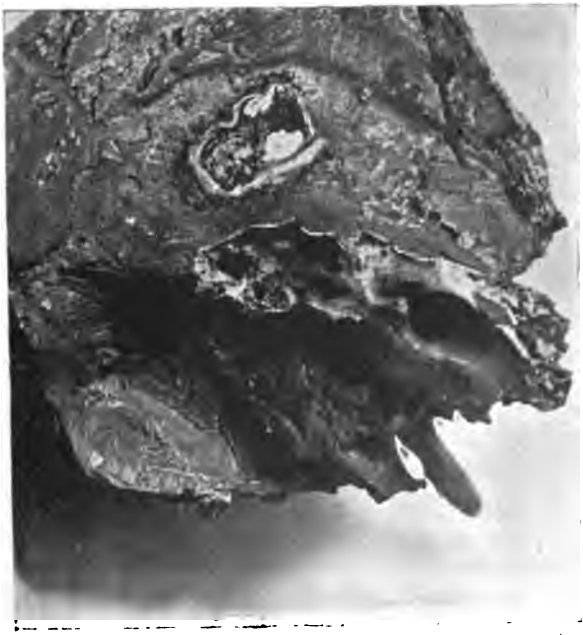


FIG. 2.

When I paid the second morning visit after the patient's admission, I witnessed one of his intense paroxysms. He was lying in bed with his glassy eyes fixed against the ceiling and his head continuously jerking from side to side, the muscles of the neck in almost continuous twitching, his sensorium was greatly depressed, so that only a very loud question would elicit the answer "pain." As I was at a loss how to proceed in a case so obscure as to the real seat of the pathological lesion, I administered a dose of chloral and bromide potassium of 25 grains each, and awaited developments. After a sleep of about two hours, the patient awoke screaming at the top of his voice with pain. A renewed examination of the mastoid region, the region of the squama, and the drum cavity, yielded only negative results. Notwithstanding, I came to the conclusion to perform Wilde's incision, and examine the mastoid process more directly. After the administration of ether, an incision along the whole process and about a quarter of an inch below its apex was made, and the periosteum carefully dissected from both sides to the extent of about a quarter of an inch. As I anticipated, the bone was perfectly sound and hard, and the apex did not show the slightest necrosed spot. The wound was sewed up and covered with antiseptic gauze, while in its lowest corner a small strip of antiseptic lint was placed, to prevent the sinking of possible pus along the sheath of the sterno-cleido-mastoid.

The wound healed rapidly, and to my satisfaction and surprise the condition of my patient had visibly improved. Twenty-four hours after the operation the severity of the head symptoms had entirely disappeared, and the intellect of the man was brighter than since his admission (three days before). Besides bed-rest, tonic treatment of quinia and iron and small doses of wine at his meals were ordered. There was no fever, no rigor, nor any symptom of grave disturbance of the patient's general condition. On the third evening after the operation, the temperature rose under a complaint of pulsating headache in the right temporal region, to 102.5° F., and over the auricle I noticed a slight doughy swelling which slightly pushed the upper lobe forward, and which, upon dimpling, indicated fluctuation. Though late at night, I concluded to open the incipient abscess, and, by a vertical incision in close contact with the bone, freed at least an ounce of creamy pus by the incision. On carefully probing the wound down to the bone, I found the outer table very spongy and soft, so that I concluded that a carious process had led to perforation from within, and that I had to deal with an abscess of the skull cavity making its way to the outside through the carious and softened squama ossis temporalis. The incision was lightly blocked with antiseptic gauze, so as to permit a continuous escape of pus, and the patient rallied soon from the narcosis. He remained, however, somnolent for the next twenty-four hours, and died the next afternoon in coma without displaying any other symptoms.

After **opening the skull,** a high state of hyperæmia was seen, occupying the whole right side of the brain, and, on lifting the right temporal lobe, about two tablespoonfuls of bloody pus were found in the fossa temporalis and along the pyramid of the os petrosum. The inner wall of the squama ossis temporalis was perforated by many small fissures, which, on the slightest pressure made by the finger, would break down and leave finally in the macerated os temporum an irregular, rough-edged hole of six lines long and five lines broad, communicating through the thickness of the squama with an opening of about the same dimensions and situated directly over the upper wall of the meatus auditorius ext.[1] There is also a pus-cavity extending almost an inch horizontally between the diploë of the squama toward the processus mastoideus, ending blindly without entering its cells, which circumstance is evidently owing to the fact that the mastoid in this case is of dense texture and not of the large alveolar variety. Along the upper ridge of the pyramid are extensive carious destructions, extending along the whole margin.

The brain itself was in its right half very soft and brittle, the cross-sections showed a high venous stasis, and the sinus lateralis was filled with about twice the usual quantity of serum. Nowhere could I find an abscess in the brain substance or a distinctly formed thrombosis of the sinus, so that I had before me a case of epimeningeal abscess caused by caries of the os temporale and ending in perforation of the squama, with the rare distinction of total freedom of disease of the mastoid process.

---

[1] See Figs. 1 and 2, showing the external and internal surfaces of the temporal, with the perforation and other conditions mentioned in the text.

# A CASE OF ANCHYLOSIS OF THE STAPES AND A CASE OF NERVE DEAFNESS, WITH MANOMETRIC EXAMINATIONS AND AUTOPSIES.

By Prof. F. BEZOLD, Munich.

Translated by Dr. Ward A. Holden.

(*With Plate I. of vol. xxiv. of German edition.*)

NOTWITHSTANDING the numerous clinical histories, aurists still differ in their veiws as to the functional symptoms dependent upon middle-ear affections and those dependent upon nerve diseases.

Continued clinical examinations in selected cases have given us results that leave no doubt as to the differential diagnostic value of the comparative examination of bone- and air-conduction and of tone perception.

Absolute proof, however, can be obtained only from the post-mortem examination of such cases as have exhibited in life the functional symptom-complex characteristic of each affection.

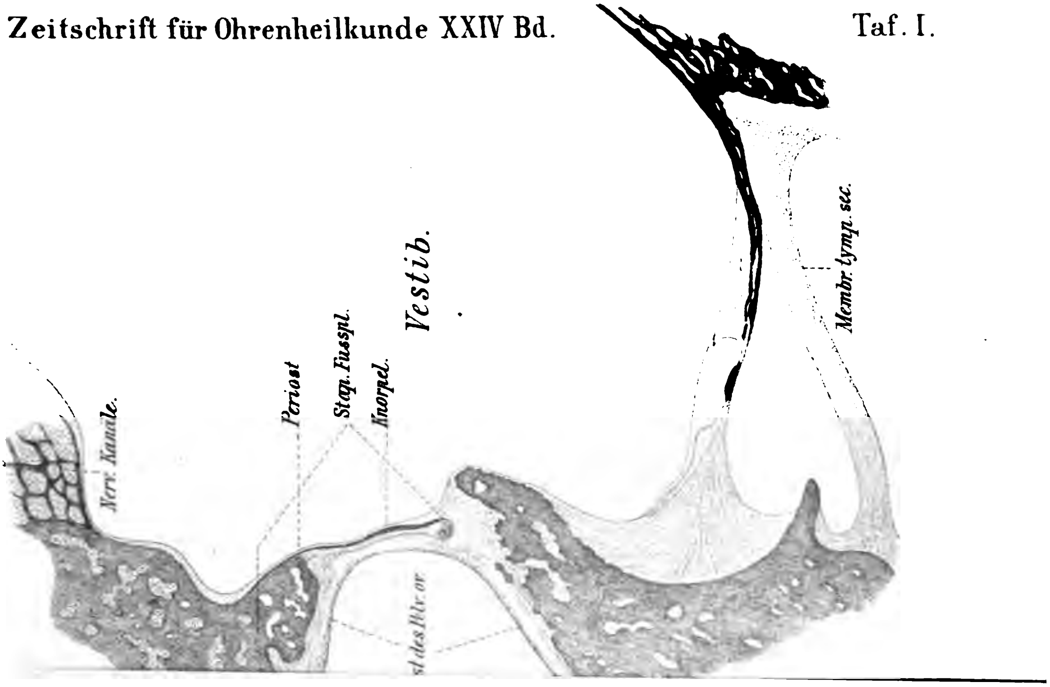
In 1885 I reported the post-mortem examination of a case of anchylosis of the stapes in which Rinné was negative and bone-conduction was increased. Politzer reported at the same time a similar case, and since then others have been reported.

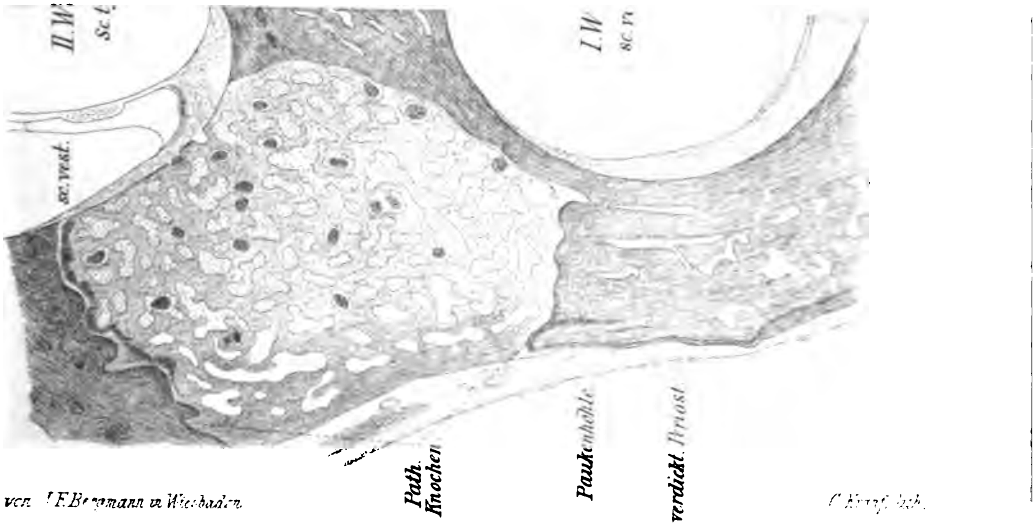
The second case which I wish now to report was examined last year. It was entirely similar to the case I previously reported and to Katz's case. Here also there was bilateral excessive hardness of hearing with negative Rinné and increased bone-conduction notwithstanding old age.

48

Zeitschrift für Ohrenheilkunde XXIV Bd.

Taf. I.





Verlag von J. F. Bergmann in Wiesbaden.

C. Kraft lith.

# A CASE OF ANCHYLOSIS OF THE STAPES AND A CASE OF NERVE DEAFNESS, WITH MANOMETRIC EXAMINATIONS AND AUTOPSIES.

By Prof. F. BEZOLD, Munich.

Translated by Dr. Ward A. Holden.

(*With Plate I. of vol. xxiv. of German edition.*)

NOTWITHSTANDING the numerous clinical histories, aurists still differ in their veiws as to the functional symptoms dependent upon middle-ear affections and those dependent upon nerve diseases.

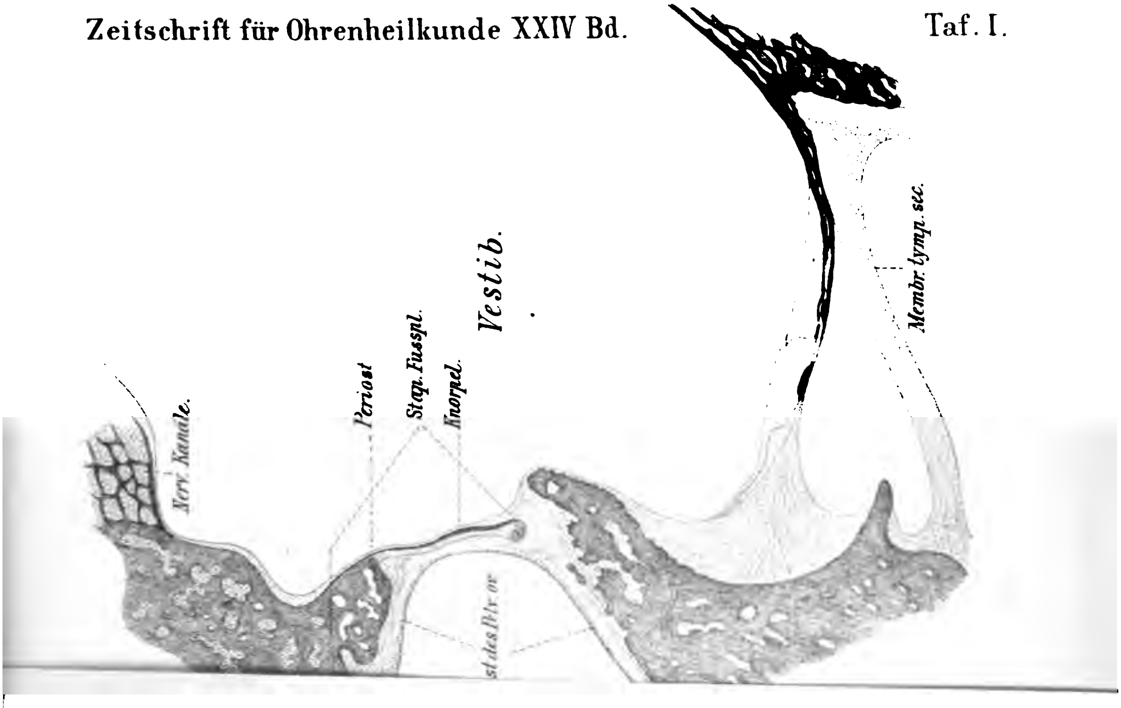
Continued clinical examinations in selected cases have given us results that leave no doubt as to the differential diagnostic value of the comparative examination of bone- and air-conduction and of tone perception.

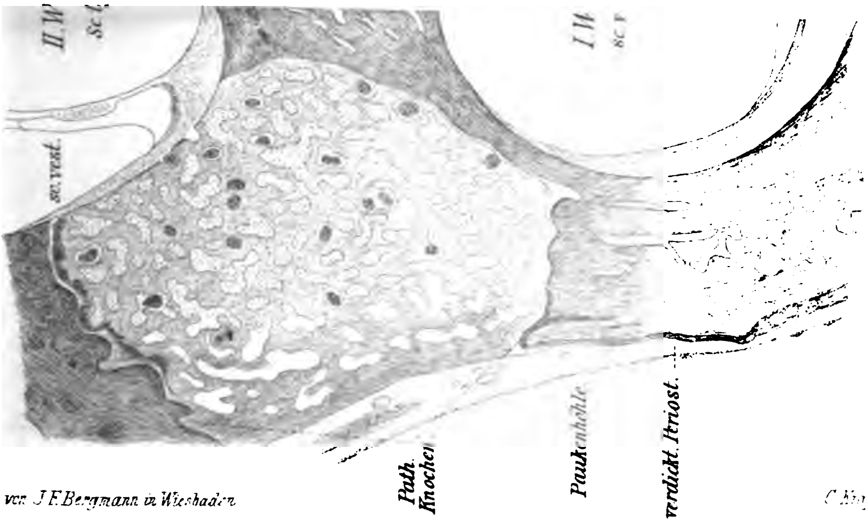
Absolute proof, however, can be obtained only from the post-mortem examination of such cases as have exhibited in life the functional symptom-complex characteristic of each affection.

In 1885 I reported the post-mortem examination of a case of anchylosis of the stapes in which Rinné was negative and bone-conduction was increased. Politzer reported at the same time a similar case, and since then others have been reported.

The second case which I wish now to report was examined last year. It was entirely similar to the case I previously reported and to Katz's case. Here also there was bilateral excessive hardness of hearing with negative Rinné and increased bone-conduction notwithstanding old age.

Zeitschrift für Ohrenheilkunde XXIV Bd. Taf. I.





Verlag von J. F. Bergmann in Wiesbaden

C. Kapp lith.

# A CASE OF ANCHYLOSIS OF THE STAPES AND A CASE OF NERVE DEAFNESS, WITH MANOMETRIC EXAMINATIONS AND AUTOPSIES.

By Prof. F. BEZOLD, Munich.

Translated by Dr. Ward A. Holden.

(*With Plate I. of vol. xxiv. of German edition.*)

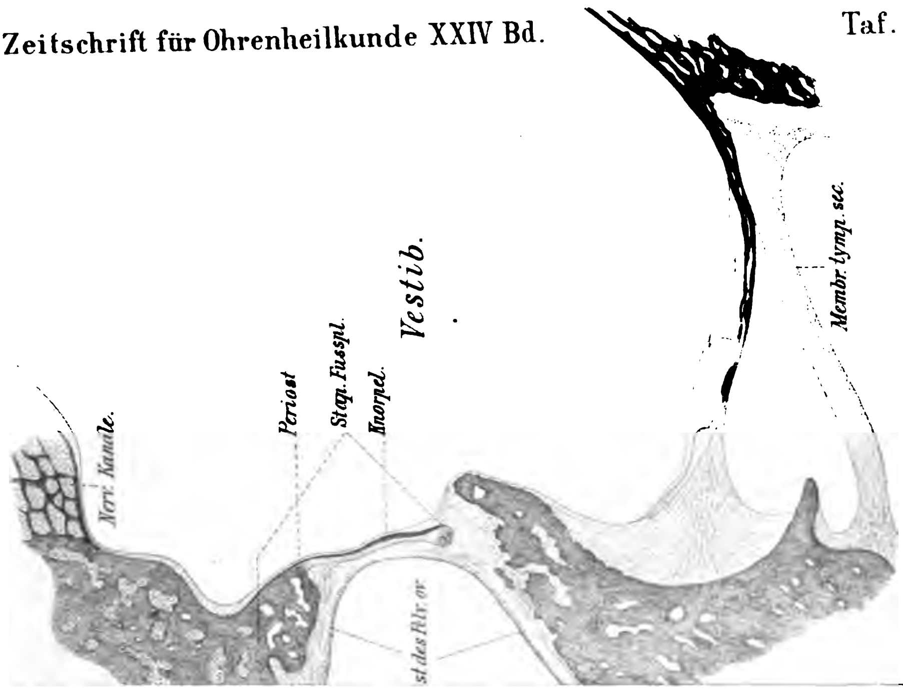
NOTWITHSTANDING the numerous clinical histories, aurists still differ in their veiws as to the functional symptoms dependent upon middle-ear affections and those dependent upon nerve diseases.

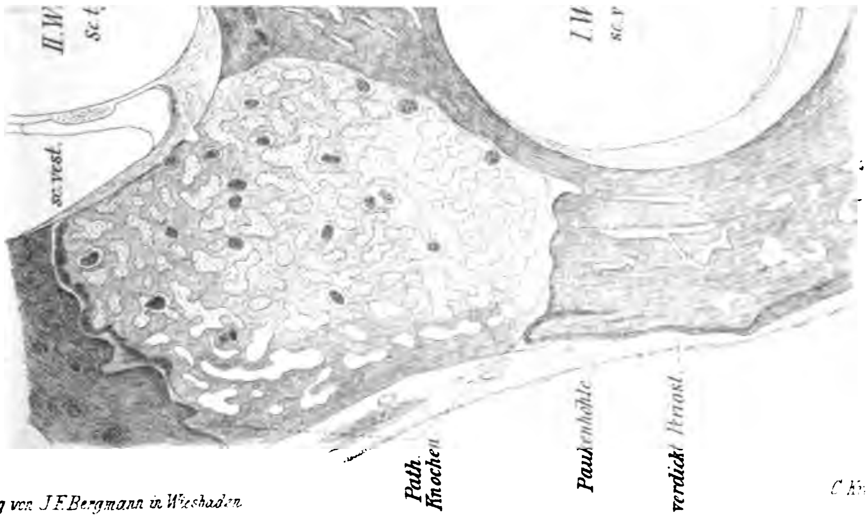
Continued clinical examinations in selected cases have given us results that leave no doubt as to the differential diagnostic value of the comparative examination of bone- and air-conduction and of tone perception.

Absolute proof, however, can be obtained only from the post-mortem examination of such cases as have exhibited in life the functional symptom-complex characteristic of each affection.

In 1885 I reported the post-mortem examination of a case of anchylosis of the stapes in which Rinné was negative and bone-conduction was increased. Politzer reported at the same time a similar case, and since then others have been reported.

The second case which I wish now to report was examined last year. It was entirely similar to the case I previously reported and to Katz's case. Here also there was bilateral excessive hardness of hearing with negative Rinné and increased bone-conduction notwithstanding old age.





Verlag von J. F. Bergmann in Wiesbaden.

C. Knapp lith.

# A CASE OF ANCHYLOSIS OF THE STAPES AND A CASE OF NERVE DEAFNESS, WITH MANOMETRIC EXAMINATIONS AND AUTOPSIES.

By Prof. F. BEZOLD, Munich.

Translated by Dr. Ward A. Holden.

(*With Plate I. of vol. xxiv. of German edition.*)

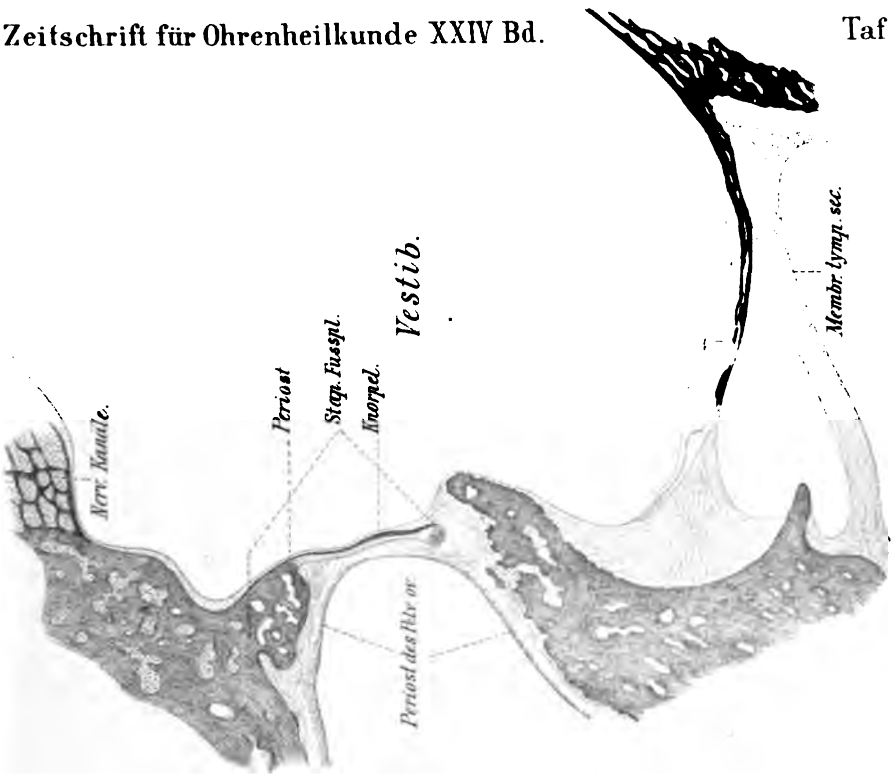
Notice: The lithographic plate accompanying Dr. Bezold's paper on "Stapes Anchylosis" not yet having been received from Germany, will be furnished in our next issue together with other plates. H. K.

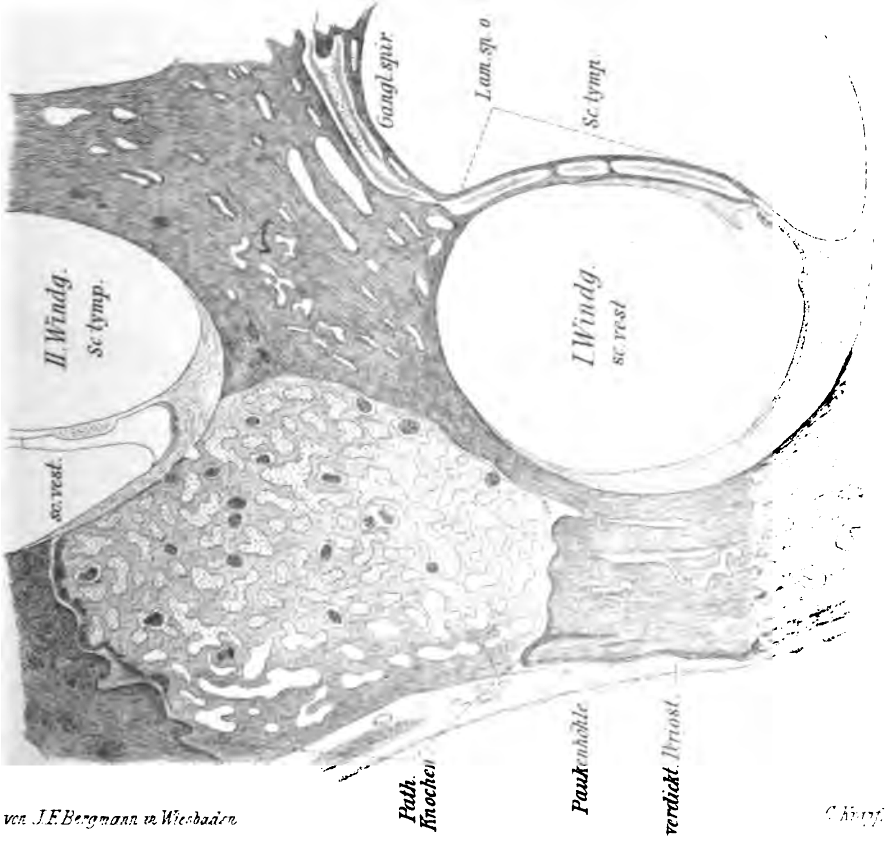
[illegible] reported the post-mortem examination of a case of anchylosis of the stapes in which Rinné was negative and bone-conduction was increased. Politzer reported at the same time a similar case, and since then others have been reported.

The second case which I wish now to report was examined last year. It was entirely similar to the case I previously reported and to Katz's case. Here also there was bilateral excessive hardness of hearing with negative Rinné and increased bone-conduction notwithstanding old age.

Zeitschrift für Ohrenheilkunde XXIV Bd.

Taf. I.





Verlag von J.F. Bergmann in Wiesbaden

C. Kirst lith.

There was also, as is found in all these cases, a shortening of the lower portion of the scale for air-conduction. We diagnosed anchylosis of the stapes in life, and the autopsy confirmed the diagnosis.

E. S., a woman of sixty-five, was admitted to the hospital for carcinoma ventriculi. Thirty-eight years before she had typhus, since which time her hearing has been poor and had gradually grown worse in the last nine years. No tinnitus, no giddiness. Father and sister hard of hearing.

Both malleus handles nearly horizontal, normal reflex on both *Mtt.* R. an opaque strip from the short process backward, without the formation of a fold; L. irregular opacity of the entire posterior half of the *Mt.* R. conversation not heard, L. at 2 *cm.* Bone-conduction for A on the vertex 19 sec. lengthened, for a′ equal to mine. Rinné negative on each side; R. — 15, L. — 13 sec. (normal + 30 sec.).

The lower tone limit was h in each ear for air-conduction; the upper tone limit was R. Galton 6.4, L. 6.3 (normal limit of the whistle used 2.3). The limits are sharp. There are no breaks in the scale. Low forks not heard by air-conduction are still heard on the vertex.

Three weeks after the examination the patient died of pleuro-pneumonia. At the autopsy a carcinoma of the cardia was found.

*Autopsy.*—Both *Mtt* showed a fresh injection of the vessels of the malleus handle, which had not been present three weeks before. After the tympanic cavity had been sawed through parallel to the membrana tympani, the mucous membrane of the promontory was seen to be moderately injected but not much swollen. At the bottom of the cavity the membrane was moderately thickened. The mucous membrane of the ossicles was not thickened. There was considerable tenacious secretion in both cavities. On the right side the crura of the stapes were covered with thin semi-transparent mucous membranes, the upper one perforated; a similar membrane covered the niche of the round window. The tubes were wide and free from swelling or injection. The mucous membrane of the rhino-pharynx so far as preserved with the preparation was normal.

There was then a fresh middle-ear suppuration of mild degree, which was to be considered as a symptom of the terminal pneumonia, particularly as Dr. Scheibe found the diplococcus pneumoniæ in the secretion.

Before the tympanic cavities were opened manometric examinations were made ; the results, however, were unfortunately complicated by the presence of mucus. Before the semicircular canals were opened, the pneumatic middle-ear cavities lying directly lateral to the canals were filed open, the right being filled with amber-colored serum, the left being empty.

*Manometric examination* (after cementing these cells).—The colored fluid in the manometer tube in the upper semicircular canal rose 1 *cm* in the right, and ½ *cm* in the left with pressure on the interdural sac of the aqueduct. It rose in the right only, ½ *mm* with pressure on the porus acust. int. It did not rise with pressure on the orifice of the aquæductus cochleæ on either side.

*Right temporal bone.* Tympanic cavity unopened. Inflàtion of air through a tube in the external canal caused the fluid in the labyrinth manometer to rise 1½ *mm*, exhaustion of the air caused it to fall 2½ *mm*. As anchylosis of both stapes was found later, the movements of the *Mt* must have been communicated to the membrane of the round window by the secretion in the tympanic cavity.

Compressing the air with a balloon from the Eustachian tube gave a positive movement of 4½ *mm*, exhausting the air gave a negative movement of 3½ *mm*.

After removing the tegmen tympani, compressing the air in the external canal produced a positive movement of 1 *mm* ; and exhausting it, a movement of ⅛ *mm*. A style, 10 *cm* long, cemented on the head of the malleus, moved outward 2 and inward 4 *mm*. This slight excursion may be explained by the fact that the *Mt* had been ruptured artificially.

*Left temporal bone.*

| | |
|---|---|
| Tympanic cavity unopened. | |
| From external canal . . | + ½ and − ½ *mm*. |
| From the tube . . . | + 4 and − 4 *mm*. |
| Tympanic cavity opened. | |
| From canal . . . . | + 0 and − ½ *mm*. |

The style on the malleus moved outward 3 *mm* ; inward, 7 *mm*. On the incus, outward, 1 *mm* ; inward, 4 *mm*. The mobility in the malleus and the incus was much reduced but not lost.

After disarticulating the incus and stapedius and sawing through the tympanic cavity, the head of the stapes, on each side, was found to be quite immovable when touched with the sound. On the right side, where the labyrinth was sawed away, the fixation of the stapes could be demonstrated also from the foot-plate.

The foot-plate rests securely in the oval window even after the bone is macerated. Examined with a loupe from the inner side, the bony vestibular wall near the foot-plate appears rough, uneven, and of a more whitish-gray color than the surrounding bone.

The left temporal bone was cut in microscopic sections. Even microscopically the niche of the oval window was seen to be narrowed above by new formation of bone. In the outer labyrinthine wall there was a sharply defined bony mass staining differently from the normal bone (Fig. 1). The foot-plate of the stapes was, for the most part, surrounded by the new bone (Fig. 2). The new bone extended upward to the canals for the facial nerve, the tensor tympani, the nerves of the vestibule, and even to the vestibule itself, and between the first and second turns of the cochlea where it reached the periosteum but left the form of the depression unchanged. Only in the niche of the oval window did it form a projection from above, and also seemed to narrow the canal of the nerve for the outer semicircular canal.

The transformed bone consisted, for the most part, of young osteoid tissue with many medullary cavities, containing numerous giant cells. In some parts it consisted of spongy substance which took the place of the normal compact substance. The limits between the osteoid and the spongy tissue were not sharp, and the latter, poor in cells, seemed to represent a later developmental stage of the other. The younger osteoid substance was found, particularly on the labyrinth side; the older, spongy on the tympanic cavity side. The margin of the niche of the oval window, however, was partially formed of osteoid substance.

At three points in the niche the transformed bone reached the foot-plate itself and was adherent to it. These adhesions consisted of spongy substance for the most part.

# A CASE OF ANCHYLOSIS OF THE STAPES AND A CASE OF NERVE DEAFNESS, WITH MANOMETRIC EXAMINATIONS AND AUTOPSIES.

By Prof. F. BEZOLD, Munich.

Translated by Dr. Ward A. Holden.

(*With Plate I. of vol. xxiv. of German edition.*)

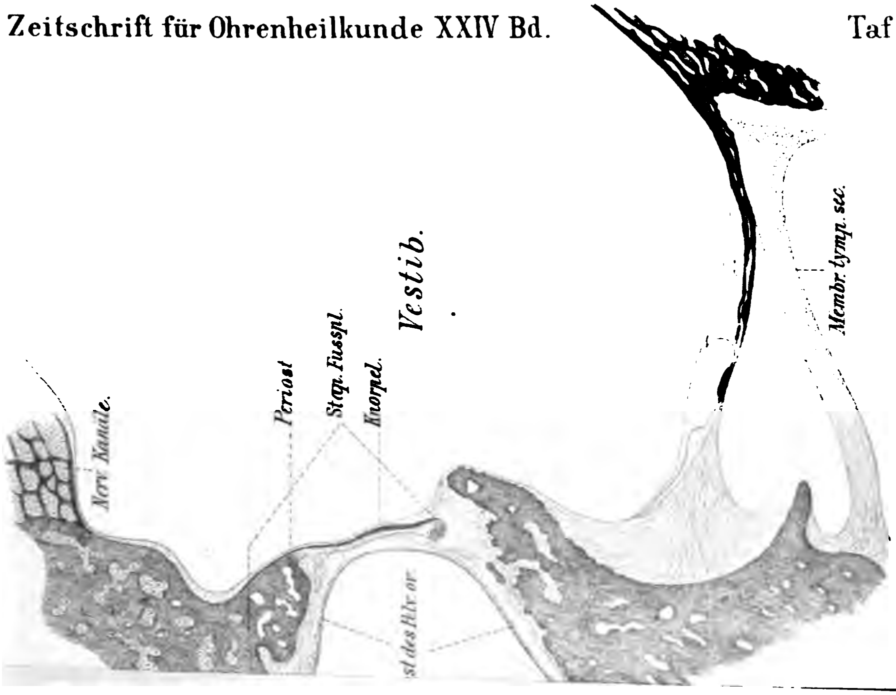
NOTWITHSTANDING the numerous clinical histories, aurists still differ in their veiws as to the functional symptoms dependent upon middle-ear affections and those dependent upon nerve diseases.

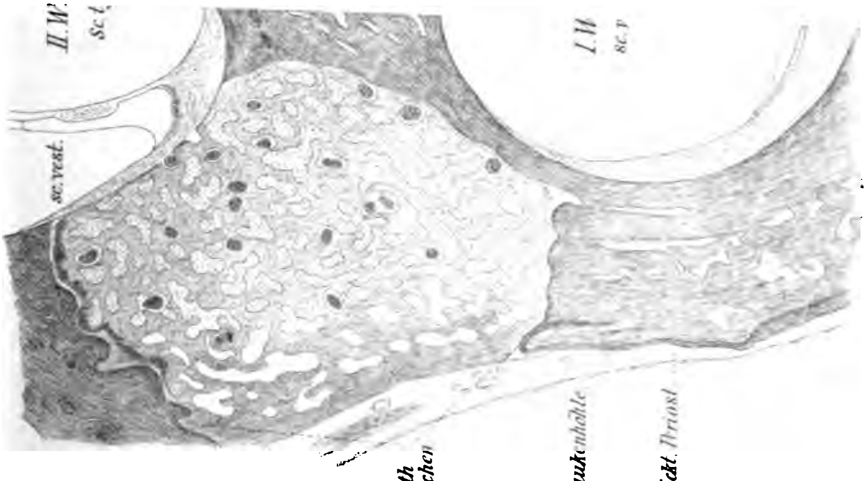
Continued clinical examinations in selected cases have given us results that leave no doubt as to the differential diagnostic value of the comparative examination of bone- and air-conduction and of tone perception.

Absolute proof, however, can be obtained only from the post-mortem examination of such cases as have exhibited in life the functional symptom-complex characteristic of each affection.

In 1885 I reported the post-mortem examination of a case of anchylosis of the stapes in which Rinné was negative and bone-conduction was increased. Politzer reported at the same time a similar case, and since then others have been reported.

The second case which I wish now to report was examined last year. It was entirely similar to the case I previously reported and to Katz's case. Here also there was bilateral excessive hardness of hearing with negative Rinné and increased bone-conduction notwithstanding old age.





Verlag von J. F. Bergmann in Wiesbaden.
C. Kapp lith.

In the tegmen tympani were many translucent bony cells, partly of a bluish-red color. Mouth of the tube wide and pale.

*Manometric examination* (after cementing the cells).—Pressure on the aq. cochleæ caused the fluid in the tube to rise. Pressure on the porus acusticus int. did not produce any movement.

Tympanic cavity unopened : with positive pressure in canal, + 2 *mm.*; with negative, — 4 *mm.*

Saying " p " near the mouth of the tube caused a positive and negative excursion of ⅛ *mm.*

From the tube a positive movement of 4 and a negative of 6 *mm* was produced (round window). Tympanic cavity opened by removing the tegmen tympani. Inflation through tube caused considerable muco-purulent secretion to be expelled through the tegmen, after which, from canal positive pressure, + ¼ *mm* ; negative, — 2¼ *mm.*

No movement when " p " was said near the tube. At the bottom of the tympanic cavity and in the antrum was considerable purulent secretion. The entire mucous membrane was swollen.

The head of the stapes moved normally. The mucous membrane of the middle ear was much more inflamed than in the preceding case.

The periosteum of the internal auditory meatus was normal. In the cochlea there was an atrophy of the nerve fibres similar to that in the other case, but more extensive. The atrophy was well marked in the first turn, less so in the second, and scarcely noticeable in the apex. The decrease in the number of atrophic fibres was inconstant and irregular, and this was also the case with the ganglion cells in Rosenthal's canal. The structures of the ductus cochlearis were poorly preserved in many places, so that nothing definite could be said in regard to Corti's organ.

There were other changes which probably should be considered the results of previous inflammatory changes and which possibly explain the nerve atrophy.

At the beginning of the first turn the ligamentum spirale was narrowed in the portion lying on the outer wall, and the portion passing over into the lamina spiralis was drawn out into the interior of the canal. At this point Reissner's membrane was adherent to the stria vascularis and the prominentia spiralis. In the further course of the basal turn a thin layer of cellular partially pigmented tissue lay on the periosteum of the lamina spiralis ossea. In the middle of the first turn a short, bony excrescence with thickened periosteum arose from the cochlear wall. In the second turn was a similar excrescence. The nerve bundles for the utricle and the three semicircular canals were somewhat thinner than usual, the intermediate connective tissue increased. The epithelium of the macula of the utricle was shrunken and contained a cyst with granular contents. In another part a pigmented connective-tissue layer lay on the epithelium. The epithelium of the crista of the upper and outer semicircular canals was filled with finely granular pigment.

The nerve and the macula of the saccule were not well shown in the sections. The aqueducts showed no changes.

If we compare the two clinical histories, it is seen that the first showed the three cardinal symptoms on which I have been accustomed to base the diagnosis of a marked defect in the motility of the conducting apparatus, viz., negative Rinné, prolonged bone-conduction for low tones, and a large defect at the lower end of the scale for air-conduction. A small defect in the upper portion of the scale, as in this case, is not infrequent in sclerosis.

The second case was functionally the opposite of the first. Only a small portion in the middle register was preserved for air-conduction; bone-conduction was completely wanting, and Rinné in the other ear was positive.

The pathological examination in each case confirmed the clinical diagnosis. The fixation in the conducting apparatus in the first case was due to a bony anchylosis of the foot-plate of the stapes, affecting a considerable portion of the annular ligament.

The nerve deafness diagnosed in the second case was confirmed by the atrophy found in the first and second turns.

Both cases go to prove the truth of Hemholtz's theory. We should have expected to have found in Case 2 an atrophy in the third turn equal to that in the first. It is possible, however, that there were changes in Corti's organ which, in its poor state of preservation, escaped notice. On the other hand, there may have been a central lesion to account for the defect in the lower register. To be direct proof against the truth of Helmholtz's theory, an atrophy must have been found in a portion of the cochlear scale, and also good hearing in life in that portion of the tone scale which, according to Helmholtz, corresponds to this portion of the cochlea.

Both cases illustrate the necessity of examining the ear with the continuous tone series, and also of comparing the air- and the bone-conduction, for a scientific application of the results of the functional examination and of the autopsy.

The pathological interest of the first case centres in the sharply circumscribed osteitis in the outer labyrinth wall, causing the anchylosis of the stapes.

As to the terminal middle-ear suppuration found in each case, it should be mentioned that serum was found in one portion of the middle ear and purulent secretion in another, while a more remote portion of the cells was empty.

In consequence of the terminal affection in the two cases, the manometric examination could not be expected to give unequivocal results. But the latter were such that they offered no features that might not be satisfactorily explained by the complications found.

### EXPLANATION OF FIG. I (STAPES ANCHYLOSIS).

Vertical section through the outer labyrinth wall anterior to the pelvis ovalis and the first and second turns of the cochlea.

The diseased bone is recognized by its pale color (hematoxylin stain). A small portion near the tympanic cavity is spongy with many cavities. The larger portion lying between the first and second turns, consists of osteoid substance with numerous cells, the medullary cavities being completely filled with cells. The periosteum on the side of the tympanic cavity is thickened and vascular, and the superficial layer of the mucosa is infiltrated with pus cells (terminal otitis med. pur. acuta).

### FIG. 2 (SAME MAGNIFICATION).

Vertical section through the pelvis ovalis and the foot-plate of the stapes.

The diseased bone is darker, as the specimen was stained with carmine. The upper portion of the foot-plate is much thickened, involved in the spongy transformed bone, and adherent to the margin of the pelvis ovalis. The inner surface only is covered with cartilage. At the lower margin of the foot-plate the pathologically changed margin of the pelvis ovalis is rarefied and destroyed, so that the annular ligament appears very broad. The diseased bone extends upward to the canal for the nerves of the vestibule and the two upper ampullæ. The periosteum in the pelvis ovalis is much thickened—on the labyrinthine side of the foot-plate not perceptibly.

# TWO CASES OF BASAL FRACTURE.

By Dr. SCHMIEDEKE, Surgeon German Army.

(*With one figure in the text.*)

Translated and abridged by Dr. J. A. Spalding, Portland, Me.

Case 1.—A dragoon was brought to the hospital, November 22, 1892, in an unconscious condition. Whilst jumping his horse over a ditch he had fallen and struck the left side of his head against a log. He immediately became unconscious, breathed stertorously, and his pulse fell to 60. When brought to the hospital the pulse was faster, and there was slight epistaxis. The right pupil reacted; the action of the left, owing to swelling of the parts, could not be determined. Slight vomiting of blood, probably from that which had run from the nose and had been swallowed. Great sensitiveness to pressure all over the left side of the head. Eye movements appear normal. There is no blood in the external meatus on either side, and both *Mtt* are normal. The hearing could not be tested; there seemed to be no loss of sensitiveness in the skin; and no paresis was visible.

For eight days the patient remained about the same, though the swelling around the left eye gradually decreased, so that a complete oculomotor paralysis could be discovered. Ptosis, heteronymous diplopia, difference in level of the images, and deviation of eyeball outward. No ophthalmoscopic alterations. Hearing normal in both ears. Loss of smell; and vertigo on attempting to stand.

Consciousness returned slowly, and on the sixteenth day suppurative tonsillitis set in, followed by otorrhœa on the left side and rapid decrease in hearing. Perforation could not actually be determined, but the meatus was so much swollen that the examination was extremely difficult. At the end of another week the suppuration from the left ear increased, the temperature rose to 39.2° C. (102.8° F.), pain became severe all over the head, and hearing in the left ear was lost. Before narcotizing the patient on the following day, preparatory to chiselling the mastoid, he said that the diplopia had disappeared, and it was noticed that the globe was in its normal position.

On laying bare the mastoid, we discovered a fine fissure in the bone, 3 *cm* long, about 1 *cm* behind the bony portion of the meatus, and the same distance above the summit of the mastoid process. A drop of pus was escaping from the lower end. The chisel easily entered the antrum, and a small amount of pus was evacuated. The secretion soon became serous, and in about three weeks ceased. Four weeks after the operation the wound was closed. No symptoms were noticed during recovery, except extreme vertigo on attempting to stand or walk. The patient was discharged about the end of March, with normal hearing in the left ear, and good vision. The sense of smell was lost; no alterations inside the nostrils. The left side of the face was constantly reddened in comparison with the right, and perspired more freely. Occasional ache in the left side of the head.

The explanation of the various disturbances following the injury is as follows:

After establishing the presence of the fissure in the temporal bone, which corresponded with the external base of the pyramid, it seemed as if we should hold an extension of the external fracture into the pyramid responsible for all the disturbances. We should then assume that the anterior upper surface had been affected by the fracture, and had excited intracranial hemorrhage in the middle cranial fossa, giving rise to the oculo-motor paralysis and the long unconsciousness. As resorption followed, consciousness and the paralysis gradually improved, so that on the twenty-fourth day the patient was wholly conscious, and had good vision.

The hearing was not affected by the injury, and did not become impaired until the otorrhœa, excited by tonsillitis, set in on the seventeenth day. On the contrary, there was much dizziness from the time of the accident, gradually decreasing as time went on, then increasing greatly after the operation, and finally decreasing once more. But, even when the patient was able to sit up out of bed, he was dizzy on attempting to walk out-of-doors.

If we accept a lesion of the anterior superior surface of the pyramid, we can imagine the fracture running in such a way as to touch the superior semicircular canal and produce the vertigo, which did not entirely disappear for three or four months. Moreover, if the fracture ran in that direction, we could harmonize with the injury the absence of loss of hearing.

The favorable course of the middle-ear suppuration, which, despite encroachment upon the cells of the mastoid process, did not produce any further disturbance, can be utilized as proof that by this time the fracture in the pyramidal portion of the temporal bone was healed; otherwise, the suppuration must have extended to the meninges of the brain.

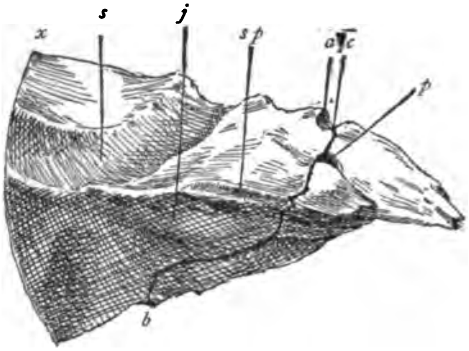
The loss of smell may have depended upon rupture of the olfactory bulbs when the patient fell. Nevertheless, as the nose was considerably crushed by the accident, and as the middle turbinated bones still exhibit hypertrophic mucosa, the anosmia may be referred to an obstruction in the nose.

Case 2.—February 11, 1893, a soldier fell 20 *m* upon the hard earth on the right side of his head; hemorrhage from the right ear and vomiting. Three hours after the accident he was brought to the hospital, where, during the dressing of an extensive injury of the soft parts about the right knee, he appeared to be perfectly conscious, and gave apparently correct answers to all questions. His chief complaint was of pain in the right side of his head.

Leaving aside the hemorrhage from the right ear, and the vomiting, which was repeatedly observed during the following night, the patient exhibited many grave and serious symptoms: nystagmus, inability to open his mouth, and apparently total deafness. The meatus was filled with coagulated blood, sufficiently to prevent any view of the *Mt.* The facial nerve did not seem to be affected, and there was no sensation of vertigo. Basal fracture seemed correctly diagnosticable under these circumstances, and was confirmed by the further course of the case.

High fever set in on the following day, and a gradual increase in inflammatory symptoms. The discharge from the right ear, at first scant and bloody, gradually became colorless and extremely abundant. Meningitis rapidly ensued, and the patient died on the fourth day after the injury.

The autopsy revealed an extravasation of blood as large as a silver dollar on the outer and inner surface of the squamous portion of the temporal bone, and a fracture through the squamous portion to the sutura squamosa, and extending upward perpendicularly in front of the porus acusticus externus.



After removal of the brain, a suppurative inflammation of the dura and pia at the base and surface was discovered, originating, in all probability, from the right porus acusticus. Removal of the apparently normal dura showed a complete transverse fracture of the pyramid, in connection with the fissure in the squamous portion. The fracture did not seem to affect the left half of the skull.

Removal of the temporal bone enabled the fracture to be followed more closely, and pus to be discovered in the tympanum and porus acusticus.

The connection between the meningitis (the cause of death) and the injury could not be doubted.

The annexed drawing of the specimen, well preserved in Wickersheimer's fluid, shows the course of the fracture on the two cerebral surfaces of the pyramid ; *s* signifies the region of the sinus sigmoideus ; *p*, the porus acusticus internus ; *a*, the aqueduct of the cochleà ; *s p*, the sulcus petrosus superior ; *j*, the jugum petrorsum; *x*, the angle made by the upper horizontal and the posterior frontal sawing for the removal of the temporal bone. We are to imagine the line of the fracture, *b c*, as extended beyond *b* anteriorly, quite as far as the superior margin of the squamous portion. The petrous bone had been completely fractured. Therefore to the upper line of fracture visible in the picture, there is a corresponding lower line. The upper fracture runs from the aqueduct to the lateral margin of the porus acusticus internus, past there to the upper corner of the petrous bone, and at the anterior (superior) surface it takes a direction perpendicular to the upper corner through the tegmen tympani to the depression in the summit, and so through the roof of the external meatus outward. The anterior squamous-like bony plate of the os tympanicum, which in this case is extended very far above and behind, remained intact, and formed, with the cuticular covering of the meatus, a closed tube.

The line of fracture on the inferior surface runs sharply defined between the fossa jugularis and the carotid canal perpendicularly over the vaginal process of the os tympanicum, as far as the Glasserian fissure. Then, bending around outward, it runs parallel to the Glasserian fissure, and passes close behind the posterior auricular process into the upper line of fracture. The junction of the united lines of fracture in the squamous portion lies at the point of the porus acusticus externus, which corresponds precisely with the middle line between the spina supra meatum and the posterior auricular process.

The petrous bone is divided by the fracture into a medial and lateral half, and after removal of the whole bone its petrous portion gaped several *mm* asunder, so that we could see a portion of both fractured surfaces. The uninjured facial nerve and chorda tympani could be seen within the fissure, holding as it were the two fractured portions together. After division of these two nerves, the fractured portions were united solely by the soft parts on the inferior surface, which permitted them to be separated like the leaves of a book for inspection.

A portion of the *Mt* with the hammer followed the medial fracture; the ligamentum mallei is in contact with the hammer, the head of which remains imbedded in the anterior portion of the cupola, with its ligament. We can also recognize the anterior fold; the posterior lies with the anvil on the other portion of the bone.

The line of fracture on the wall of the labyrinth runs from above downward, passes through the facial canal directly across the foramen ovale, and separates from the latter quite a portion of its anterior circumference, so that the greatest part of the foramen vestibuli with the uninjured stapes remains with the lateral portion of the fractured bone. The anvil and stapes remain connected with each other. The result of this is that the labyrinth and the beginning of the cochlea are visible. The posterior and horizontal semicircular canals are normal, and their orifices plainly visible; the ampullar orifice of the upper canal is affected longitudinally by the fracture. The corresponding portion of the medial fractured bone contains a slight depression. As this was probably nothing but a flat rupture in the longitudinal direction, it is quite possible that the cuticular portion appertaining to the same remained unharmed. The cochlea is affected in the first convolution, only the beginning being still connected with the labyrinth, the greater portion having followed the medial portion of the bone. The fenestra rotunda lies on the lateral portion of the bone, as well as a small segment of the porus acusticus internus in the form of a flat gutter.

This condition of affairs explains the right-sided deafness, the hemorrhage from the ear, and the difficulty in opening the mouth, while the nystagmus must be regarded as a reflex action from the injured inner ear.

Comparison of the two cases shows how differently the injuries acted on the general condition of the patients. In the first, unconsciousness for days, and vertigo for months; and in the second, complete consciousness and capacity for expression (until meningitis ensued).

It is possible that in the first case the general disturbances, as already suggested, were due to intracranial hemorrhages in the middle cranial fossa, produced by a lesion of the dura against the fracture at the anterior surface of the pyramid; while in the second case, as the autopsy verified, the dura remained intact, and, owing to this, the actual fissure transversely across the pyramid shut itself up in such a way that the blood could not escape. Hence the abundant discharge of colorless fluid, from the second day on, could not be referred to the brain as its source, but to the opened labyrinth.

# A CASE OF PRIMARY TUBERCULOSIS OF THE MASTOID PROCESS.

### BY HERMAN KNAPP.

SCHWARTZE in his excellent monograph on the *Operations on the Ear*,[1] declares primary ostitis, and in particular primary tuberculosis, of the mastoid process to be an eminently rare affection, in the diagnosis of which we could not be too reserved nor too distrustful. This assertion may be true in general, but on the other hand, as far as bone tuberculosis of the temporal is concerned, the rarity with which we diagnosticate this affection may be owing to the omission of special bacteriological examinations of carious bones of the ear. Not long ago nobody thought of considering the not infrequent cases of caries of the orbital margin as bone tuberculosis, yet at present the majority of them is demonstrated to be of that nature. An example of primary caries of the mastoid, the tubercular origin of which none of my readers will doubt, although no bacteriological examination was made, came under my care at the N. Y. Ophthalmic and Aural Institute.

Milly Cuneo, æt. five, of 236 Bleecker Street, New York City, was brought to the clinic in December, 1892. She was a pale, ill-fed, neglected child of scrofulous habit. She had a spondylitic ulcer on her back and a large granulating ulcer under the left ankle. A large ulcer was on the upper margin of the right and another on the lower outer margin of the left eye. The right mastoid and supra-auricular portion of the temporal bone were swollen, ulcerous, granulating, and discharging fetid matter. Both auricles, ear-canals, tympanic membranes, and middle ears were perfectly normal as far as physical examination could discover. Hearing in both ears unimpaired. This condition had existed for many months.

---

[1] *Handbuch der Ohrenheilkunde*, Bd. ii., 1893, p. 797.

On Dec. 22, 1892, I opened largely the diseased parts of both orbits and removed extensive pieces of necrosed bone, in particular a part of the left zygomatic. Then I made a curved incision 1 *cm* behind the insertion of the right auricle, 4 *cm* in extent, down to the bone, from the zygomatic ridge of the squama through the linea temporalis as far as the tip of the mastoid. The bone was carious and several fistulæ led into the interior. The whole outer table of the mastoid was chiselled away. Its interior and the adjacent part of the squama were a mass of decaying bone substance which was broken down and carefully removed with a sharp spoon. The operation was prolonged until the walls of the cavity thus established felt hard and appeared healthy. All the wounds were washed out with corrosive sublimate 1:5000, those of the orbits covered, that of the mastoid tamponed, with corrosive sublimate gauze. The wound in the mastoid was syringed and dressed daily. It healed up in a few months, in the same way as the wounds at the orbit.

*Jan.* 26, 1894, I saw the child again. She had improved much in general health. A deep conical depression was running from below upward in the right mastoid, perfectly covered with skin, and causing no discomfort. A depressed scar without ectropium was on the right orbital margin, and another with ectropium of the lower eyelid on the left side. At the left ankle-joint, immediately below the external malleolus, there was still an extensive ulcer filled with granulations. In the left external ear-canal there was a collection of pus which I liberated by a free incision. No other abnormity in the ears. The child has always heard as well as other children. I sent her to the Roosevelt Hospital to have her foot treated.

The disease in the mastoid of this child is only a part of a widespread tubercular bone affection. What part tuberculosis plays in necrotic tympanic and mastoid disease is not yet sufficiently known. Investigations in this direction could be done easily enough in aural clinics with which a bacteriological laboratory is connected, or which have access to any such institution. It will not be sufficient to examine only microscopically for tubercle bacilli, the secretions, sequestra, and the granulation tissue, for in tissues these are very difficult to find. Inoculations with the morbid substances should be made on animals, by preference into the anterior chamber of rabbits, where the picture of inoculation tuberculosis is well known. As bone tuberculosis frequently is a local disease, its recognition in the ear would be valuable both prognostically and therapeutically.

# ON SERO-MUCOUS CYSTS BENEATH THE WING OF THE NOSE; WITH THE REPORT OF A CASE.

By HERMAN KNAPP.

CYSTIC tumors in the nasal fossæ are rare.

ZUCKERKANDL in his classical treatise[1] says that once only had he seen a cyst the size of a walnut, in the mucous membrane at the anterior end of the lower nasal passage. It was filled with a honey-like liquid.

P. McBRIDE[2] mentions that he found a cystic tumor which caused bulging of the mucosa just below the anterior extremity of the inferior turbinated body. An exploratory puncture resulted in a flow of serous fluid.

At the meeting of the Society of Laryngology, Otology, and Rhinology, of Paris, held Dec. 4, 1891, Dr. HY. CHATELLIER read a paper entitled, "Glandular Retention Cysts of the Anterior Part of the Nasal Fossæ," which is extensively reported in the *Journ. of Laryng., Rhinol., and Otol.*, 1892, p. 182. Chatellier details two cases which are almost identical with the one that came under my care. In the first, a woman of fifty-five years of age, presented a painless round tumor of the right lateral region of the nose, raising the skin of the ala of the nose and extending toward the malar bone. On the inner surface of the ala it was getting into the vestibule and reaching to the anterior end of the inferior turbinated. On palpation it was found the size of an almond, firm, resistent, as if filled with fluid, not adherent to the bone, on which it could be easily displaced. The interior of the nose otherwise healthy. Its commencement could not be traced, but the patient had noticed a marked increase during the last fortnight.

---

[1] *Normale u. Pathologische Anatomie der Nasenhöhle.* Wien, 1882, vol. i., p. 100.

[2] *Diseases of the Throat, Nose, and Ear.* Phila., P. Blakiston, Son, & Co., 1892, p. 303.

The second case occurred in a woman of thirty-two. A tumor, ovoid, the size of an almond, painless, cyst-like, movable, projected into the vestibule of the nose and extended under the skin adjacent to the ala. The patient did not suffer from it, but became alarmed at its increase of size.

In the discussion MARTIN stated that he had seen a similar case in the left nostril.

CARTAZ remarked that these cysts were very rare, only a few such cases having been reported.

We can increase this meagre record by another entirely similar case. Its history is as follows:

Virginia R., æt. forty-seven, of Monterey, Mexico, consulted me May 16, 1893. Seven years previously, the skin at the base of the left ala nasi was swollen and inflamed for three weeks and then was as before. Eighteen months ago the swelling returned in the same place but had not disappeared, interfering with breathing. When she presented herself, I found the following condition: A soft, fluctuating tumor, with small resistent walls, can be felt in the skin adjacent to the base of the wing and in the vestibule of the left nostril. The intra-nasal portion is covered with a smooth, evenly pink, not particularly vascular mucous membrane, free from irritation, painless on pressure, not reduced in size by cocaine. It apparently is connected with the periosteum of the floor of the nose, 3 *cm* long, 3 *cm* high, whereas the external portion extends 2 *cm* from the wing of the nose toward the cheek. The interior portion leaves the septum free, touches the anterior end of the inferior turbinated bone, and passes underneath the ala nasi over into the exterior portion. The tumor seemed to have no connection with any of the accessory cavities of the nose. It disfigured the patient by raising the wing of the nose and the adjacent skin of the cheek, but caused no other discomfort except difficulty in breathing. I advised her to have it removed, but before doing so to consult Dr. Bosworth, Dr. Bosworth considered the tumor to be a cyst, in which opinion I concurred. He endorsed my proposition of removing the tumor and was kind enough to be present at the operation. He favored the removal by Rouge's method (reaching the growth from below after detaching the upper lip from the periosteum. See Bosworth's *Diseases of the Nose and Throat*, vol. i., p. 626), I preferred that by Dieffenbach (see Bosworth, *l. c.*, p. 624), and performed the operation at the N. Y. Ophthalmic and Aural Institute, May 20, 1893, in the following manner.

The region of operation being sterilized, the patient under ether, an incision was made along the base of the left ala nasi 2.5 *cm* upward. After carefully dissecting the skin and fibrous tissue covering the tumor the surface of the latter presented itself as a dark blue, delicate membrane, evidently the wall of a serous or mucous cyst. When the malar portion of the tumor was isolated, the wing of the nose was freed and drawn upward to make free space for the separation of the nasal portion. The whole tumor, laid bare, was uniform, elliptical, as large as a walnut, and connected with the periosteum, as are many atheromatous cysts of the eyebrow. In detaching it from the periosteum its wall was accidentally incised and a clear, mucoid, liquid flowed out. The sac was then cleanly detached from the periosteum and the wound washed with a 1:5000 solution of bichloride of mercury. After cessation of the insignificant hemorrhage, the severed ala was united to its base by two delicate sutures.

The next two days the operation was followed by some fever (temp. up to 101.5°) and slight swelling in the region of the wound. This all disappeared, and the patient was discharged cured in a week. I saw her occasionally for several months. The naris was perfectly free, but instead of the former swelling of the wing and adjacent cheek the angle of the nose was slightly depressed and drawn up.

The *origin* of the sero-mucous cysts in the anterior part of the nose is obscure. They do not seem to connect with any natural cavity, in none of the cases any such connection having been discovered. They are so identical in all their features that they seem to have the same cause. Until further knowledge determines their proper place in the classification of nasal disease, I propose to call them, according to the features they have in common, sero-mucous cysts beneath the wing of the nose. Regarding their pathogenesis, Chatellier says that some owe their origin to obstruction of a gland, in others the explanation cannot be given. Cartaz says: "Cysts of the middle turbinated are most frequent, but when situated in another region their mode of development is not intelligible."

*Prognostically* they belong to the benign formations.

With regard to their *treatment* we have to choose between three methods:

1. *Evacuation by paracentesis.* Martin states that in his case single puncture produced a cure without recurrence. McBride says of his first case: "An exploratory puncture resulted in a flow of serous liquid. The cyst collapsed, but filled again, so that another puncture was made with the same result. The patient was told to return for further treatment if the tumor recurred, but as she did not do so I presume the fluid was not again secreted.[?] In the second case of the same description, I was unable to obtain a cure, so that Mr. Duncan, at my request, dissected out the cyst, after reflecting the upper lip." In the first of Dr. Chatellier's cases a puncture with a Pravaz' syringe led to a speedy relapse.

2. *Destruction of the interior surface of the cyst with heat or chemicals.*—In the case of Chatellier, just mentioned, a permanent cure was obtained by singeing the internal surface of the tumor with the galvano-cautery; in his second case, by injections of liquor Van Swieten, repeated several times until the fluid withdrawn was normal.

3. *Extirpation,* either by Rouge's method (case of McBride-Duncan), or Dieffenbach's (my own case).

The *first* mode of treatment seems to be as unreliable in this as it is in other cysts. The *second* method, cauterization of the inner surface of the sac, may effect a cure, but judging from its merits in general surgery, it is tedious, and if a portion of the cyst-wall escapes destruction, a relapse will occur, of which fact the caustic treatment of the mucocele of the lachrymal sac may be mentioned as a familiar example. The *third* method, being radical, always effects a permanent cure.

# REMOVAL OF SEQUESTRA AND A TOOTH FROM THE FLOOR OF THE NOSE.

By HERMAN KNAPP.

Edward Taylor, a healthy-looking-boy of seven years of age, of New York City, came to my clinic at the N. Y. Ophthalmic and Aural Institute December 16, 1892, with necrotic rhinitis and acute purulent otitis on the left side, and an hypertrophied tonsil on the right. The right nostril being pervious and fairly healthy he had not sought medical help before his left ear gave him trouble. I found the lower passage of his left nostril blocked with muco-pus and decaying soft and hard masses of tissue. I cleansed the nose and let him wash and gently syringe it with boric acid water for a few days, and on December 21, 1893, removed with forceps all the dead material from the nostril. Among the sequestra two were conspicuous: the one, flat and hard, was removed from the lateral side of the floor of the nostril, bordering the malar antrum; the other, from the anterior part, was cancellous and enclosed a tooth, the crown of which appeared to be turned up and back. The sequestrum was 15 *mm* long, and represented a piece of the upper jaw, the rounded alveolar surfaces separated by a layer of cancellous bone 3–5 *mm* thick. The tooth was the lateral incisor, its crown healthy and well formed, 12 *mm* long and 8 *mm* broad. Its root was decayed. Between the first incisor and the canine a probe could be passed through a rough-walled canal from the mouth into the nose, its direction being toward the nasal septum. It was omitted to ascertain whether and how large a communication existed between the nasal and the malar cavity. The boy improved quickly and left off treatment.

It seemed to me that the tooth was inverted, yet I could not assert this positively, as I found the tooth projecting into the nose, and extracted it with the sequestrum from the alveolar process to which it belonged. It is quite likely that such an inversion had taken place of which Zuckerkandl describes and depicts a very fine example,[1] and quotes the dentist SALTER, referred to by Sternberg [2] as having noticed such inversions at the upper incisors, the crowns of which appeared in the nostrils, out of which they had to be extracted.

It may, however, also be supposed that the tooth was in its natural position, and was carried up into the nostril with the sequestrum from the alveolar process of the maxillary bone. Caries or necrosis of this part of the maxillary is common, as we know from numerous cases of empyema of Highmore's antrum. I am not aware that dislocation of teeth into this cavity has ever been noticed, which, perhaps, is only a confession of my ignorance. Be this as it may, the above communication records an example of necrosis of the floor of the nose and the removal of a loose sequestrum with the corresponding incisor tooth, through the anterior naris. That an inverted tooth, projecting over the floor of the nose, should produce caries and necrosis of its alveolar walls, seems very natural if we think how easily the nasal secretion, retained by the tooth, may decay and infect the bed and the crown of the tooth.

---

[1] *Anatomie der Nasenhöhle*, 2ter Band, 1892, p. 163; plate xix., figs. 3 and 4.

[2] In *Handbuch der Zahnheilkunde*. Herausgeheben von J. Scheff.

# THE PERCUSSION OF THE MASTOID PROCESS, WITH THE REPORT OF A RECENT CASE OF DIABETIC CARIES OF THIS PORTION OF THE TEMPORAL BONE.

BY O. KOERNER AND R. VON WILD, FRANKFORT-ON-THE-MAIN.

Translated by Dr. S. E. ALLEN, Cincinnati.

AS is well known, weighty difficulties often present themselves in the diagnosis of bone disease within the mastoid. Extensive destruction of the bone substance, possibly reaching to the dura, not infrequently quickly develops, while the cortex and the overlying soft parts present no signs of disease. Indeed, increased sensibility to pressure may still be absent. Such extensive breaking down we have seen occur particularly in diabetic patients, and as a sequence to influenza.

Where external symptoms are absent, and where there is but slight pain and a continued normal temperature, the positive establishment of bone disease is often difficult or impossible. In these cases an operation is undertaken only when the appearance of meningeal irritation renders the diagnosis of bone disease certain, and points at the same time to the moment when a more serious stage of the disease has begun, so that operative help may easily come too late. Every expedient, therefore, which aids in the early diagnosis of this form of disease, deserves thorough consideration.

In this respect, Lücke's method of bone percussion rendered us, in two cases, surprisingly good service. External signs of mastoid disease were absent in both cases; there was neither swelling of the soft parts nor increased sensibility to pressure. In one case, that of a patient under treatment for an acute middle-ear suppuration, we owed the early diagnosis and the opportune operative aid entirely to the development of dulness on percussion over the mastoid.

First of all, we will report the cases.

*First Case.*—G——, coal merchant, aged sixty, was seized unaccountably on the evening of September 7, 1891, with violent pain in the depths of the right ear. This diminished during each day, increasing again at night. Early in the morning of September 12th, an abundant purulent discharge set in ; after which the pains lessened, ceasing now and then for hours, without, however, permanently disappearing.

At the request of his physician, Dr. Elle, one of us saw the patient for the first time on September 22d. He, a powerfully built and fairly well nourished man, complained of an abundant aural discharge, and of frequent pains deep in and behind the ear. These pains often radiated out over the entire half of the cranium. Temperature and pulse normal. There was a perforation the size of a pin-head in the middle of the posterior half of the drum, from which odorless pus flowed copiously. The epidermis of the drum was swollen so that only the processus brevis was visible. The mastoid was found to be perfectly normal on careful palpation and comparison with the other side. Nowhere was it sensitive to pressure. The tuning-fork on the head heard better in diseased ear.

Three days later (September 25th) the drum appeared the same, and the pains had not ceased. A slight swelling was now visible on the posterior superior wall of the meatus. The outer and posterior portion of the mastoid was normal, but there was a slight periosteal swelling, sensitive to pressure, on the anterior surface of the tip.

This new condition, in connection with the fact that the pain had continued in spite of the abundant discharge, forced the assumption that we had to do with an acute destructive process within the mastoid. As the course of the disease up to this time was similar to that of a case of diabetic caries of the mastoid reported by Koerner,[1] the suspicion was awakened that here a similar condition existed. Upon being questioned, the patient stated that he had suffered from a cough with expectoration, from the beginning of June to the middle of August, and had slowly but continually lost flesh since; this, although his appetite was remarkably good—better than it had ever been before. The amount of urine secreted was abundant; his thirst, however, was not particularly increased. The examination of the urine made then and there showed a marked amount of sugar.

---

[1] O. Koerner, "A Case of Primary Diabetic Ostitis of the Mastoid Process, with Remarks on the Influence of Major Operations on the Course of Diabetes," *Arch. f. Ohrenh.*, Bd. xxix., S. 61.

On account of the well known tendency of diabetic caries to rapid extension, we resolved to open up the mastoid on the next day, and the patient was instructed to save all the urine. During the interval (about twenty hours), on an ordinary mixed diet, 88 grams of sugar were excreted. The urine contained no albumen, no acetone, and no oxybutyric acid.

We operated on September 26th, in the presence of Dr. Elle. *When under the anæsthetic, both mastoids were percussed with a small metal hammer. Forcible percussion disclosed absolute dulness over the entire mastoid on the diseased side, whereas on the healthy side we got ordinary osseous resonance, such as could be obtained over other portions of the skull where the soft parts were of like thickness.*

The incision was made about one *cm* behind the line of insertion of the auricle, beginning above the linea temporalis and extending down almost to the tip of the process. Periosteum and outer surface of the bone normal. The opening into the bone was started below the linea temporalis and in the line of incision. At a depth of about three *mm*, the chisel came upon discolored, necrotic bone, mixed with granulations and pus. The bone was so soft that larger fragments came away than were taken up by the sharp spoon. The alteration extended down to the tip of the process, and also to the transverse sinus. The sinus and a part of the dura covering cerebellum were laid bare. The dura and sinus normal, and not covered with granulations. The sinus does not pulsate. The undermined cortex was removed in all directions with cutting forceps. The parts were disinfected with a strong sublimate solution, and tamponed with iodoform mull.

Evening, temperature normal; pulse 78; less pain.

*September 27th.*—Temperature normal. Pulse 72. No more pain.

*September 29th.*—External bandages changed, wound cavity left alone. But little pus in the meatus, and when this was cleaned away no more was seen to well up out of the perforation.

*September 30th.*—Iodoform tampon changed. The sinus now pulsates strongly.

*October 3d.*—Since the changing of the bandages on the 29th, the meatus has remained dry.

*October 18th.*—The wound is granulating nicely and closing. Perforation in the drum healed.

By the end of October, owing to the anti-diabetic diet maintained since the operation, the sugar had disappeared from the urine and did not return when the daily allowance of bread was increased. In spite of all this the patient continued to feel weak and exhausted.

On the morning of October 27th, a chill occurred which lasted one half hour, and was preceded by a slight diffuse headache. On changing the bandages at noon, the wound was found in good condition. Temperature (three hours after the chill) 38.2.°

On the next day (October 28th), the patient complained of pain and sensitiveness to pressure over the ninth rib on the left side, a few *cm* outside of the mammillary line. The pain is increased slightly on deep inspiration. Percussion and auscultation negative. Morning temperature 37.0°, evening. 38.2.°

An encapsulated empyema the size of a fist began to develop at the sensitive point. This was opened on December 8th, and in twelve days had healed. The cavity in the mastoid was completely covered with epidermis by the 24th of December. Watch heard on this side at a distance of 15 *cm.* The drum membrane normal with the exception of a cicatrix behind the umbo.

The patient kept on emaciating even after the cure of the empyema. The anti-diabetic diet was now entirely given up, as but slight traces of sugar appeared in the urine even after ingestion of food containing flour and sugar. In spite, however, of continual variation in the diet, the appetite became so reduced that, for the most part, it was only with the greatest pains that the patient could be gotten to take any nourishment at all. From the end of December on, the urine became dark brown on the addition of ferric chloride (diacetonuria). This reaction had never taken place before. Furthermore, pains began in the gastric and lumbar regions. These slowly increased and became so severe that injections of morphia had to be resorted to. A cause for this condition could not be found. Toward the end of January a mild delirium set in, and œdema of the feet, and the patient died on February 7, 1892. A post-mortem examination was not allowed. It may be remarked that there were no symptoms pointing to an accumulation of pus within the skull.

## SUMMARY.

In summing up the points in this case, we shall speak only of the diabetic disease of the mastoid. The results from percussion we shall discuss in connection with the second case.

We have to do here with a typical example of the acute mastoid caries which occurs in diabetic patients, as has been described by Kuhn[1] and Koerner.[2] An apparently healthy man is seized unaccountably with severe pain in the ear. Four and one half days later the pus breaks through the tympanic membrane, but the pain does not cease thereafter. The location of the pain, and the fact that it continued in connection with a free discharge, point to disease within the mastoid. The afebrile course and the severity of the symptoms awaken the suspicion of diabetic caries. The examination of the urine proves the correctness of this supposition. *When the mastoid is opened, only nineteen days from the time when the pain began, its interior is found to be already destroyed from the tip to the dura and transverse sinus.* After thorough removal of all the diseased bone, the purulent discharge ceases immediately, and the perforation closes between the seventh and twenty-second day.

It certainly follows from these data that we had to do with a bone suppuration arising primarily in the mastoid, and which discharged through the natural channel into the tympanic cavity, making its way outward after rupture of the drum. It is a view familiar to otologists but disputed by surgeons, that the greater number of mastoid affections result from the extension of tympanic suppuration to the mastoid cells. This, however, does not apply to caries occurring in diabetic patients—(Koerner, *l. c.*). To us the sudden occurrence of pain in this case does not denote the beginning of an inflammation in the tympanum, which inflammation afterwards extended into the mastoid, but rather, the moment in which the pus broke from the mastoid cells into the tympanic cavity. The surest proof, however, that the tympanic cavity was not diseased, but simply served as an outlet for the pus, lies in the fact that the tympanic suppuration ceased immediately after the removal of the diseased bone, the perforation in drum closing soon after.[1] The empyema pleuræ is to be regarded as a metastatic affection. The bone disease extended to the sinus, and it is easily possible that from here infectious matter got into the circulation. The simultaneous occurrence of the chill and of pain at the point where the empyema subsequently developed, allows of hardly any other interpretation.

---

[1] Kuhn, *Arch,. für Ohrenh.*, Bd. xxix., S. 29.

[2] Koerner, *l. c.*—The literature is given in these articles. A case of Huguénin, reported in his article in Ziemssen's *Pathologie and Therapie*, also belongs here. Also a case reported by Ferrer, *Zeitschrift für Ohrenh.*, Bd. xx., Case 6.

*Second Case.*—Herr Müller-Dienst, sixty-three years old, was examined for the first time on March 9, 1892. He stated that he had always been healthy, and particularly that he had never had ear trouble. Three weeks ago, during a slight attack of coryza, he noticed a watery discharge from the left ear. This he said subsequently became purulent. Neither at the commencement nor during the course of the trouble did he have any pain.

The examination of the left ear disclosed a small amount of muco-purulent odorless secretion in the canal, and a perforation the size of a hemp-seed in the lower posterior quadrant. A granulation was seen behind the perforation, partly occluding it. Epidermis of the remaining portion of the drum swollen, the outlines of the hammer perceptible. Tuning-fork on the head more pronounced in the diseased ear. Right ear normal.

The granulation was immediately removed with a pincette. There was no fever. The general condition was good, so that the patient could go about his business undisturbed. No sugar in the urine.

During the following weeks the patient came for examination once or twice a week. The discharge did not diminish. It was necessary several times to destroy the recurring granulation with chromic acid. *At every examination a comparative percussion*

---

[1] (No proof at all. Genuine tympanic suppuration generally ceases, as if by magic, after the operation.— *Translator.*)

*of both mastoids was made and both sides gave a like normal osseous resonance. On April 16th, however, percussion on the left side showed a distinctly lessened resonance, immediately noticed also by the patient himself.* Pain on percussion was not complained of. Constant comparison during careful palpation showed both sides to be still normal. A slight swelling not sensitive to the touch had, however, appeared on the posterior superior wall of the meatus near the drum.

It was at once decided to open the mastoid. The patient, however, remained away for eight days. During this time a fistula had partially developed on the posterior inferior wall of the meatus, near the border between the cartilaginous and osseous portions. A probe penetrated the bone in a backward direction. Percussion the same as on the 16th. There was still no evident swelling of the overlying soft parts. The discharge is said to have been less during the last week. There was as yet no pain in the ear or in the mastoid, although the patient states, on being questioned, that he has pain now and then along the sterno-cleido-mastoid. This has been present for a year past and has always been considered rheumatic.

*April 25th.*—Operation. Incision ½ *cm* behind the line of insertion of the auricle. Skin, periosteum, and outer layers of the bone normal. The chisel does not strike pus till at a depth of ½ *cm.* We cleaned out with the spoon a great cavity filled with pus, flabby granulations, and broken-down bone. This was then opened up to inspection by the removal of the undermined edges with forceps. The first phalanx of the middle finger can easily be introduced into the cavity. Tamponed with iodoform mull and permanent dressing applied. Bandages changed on May 12th (after 17 days). Perforation in the drum completely closed. Four weeks later complete closure of the wound. Hearing nearly normal.

## SUMMARY.

We have to do here with a central caries of the mastoid, occurring without known cause. The painless course of the trouble is remarkable, and especially the painless starting up of an aural discharge in a man to every appearance not tubercular.

In the absence of fever, pain, and swelling, it was here the percussion of the mastoid that gave us the first certain knowledge of a diseased focus within the bone. While percussion of both sides was regularly practised during several weeks and a normal tone always obtained, diminution of the resonance was discovered for the first time on April 16th. The fistula in the meatus which appeared later confirmed the diagnosis.

In the first case, we percussed the patient for the first time when anæsthetized and on the operating table. Here the central caries was made out chiefly from the ætiology (diabetes). The percussion was also even here of value in rendering the diagnosis certain, because the only symptom of bone disease then present, namely the periosteal swelling on the front portion of the tip of the process, was slight and only perceptible to the practised touch.

If we compare these two cases, we see that the degree of dulness corresponded to the extent of the bone disease in each case. In the first case, where there was extensive disease with only a thin shell of normal bone, we got absolute dulness; in the second, with a thicker cortical layer and a smaller carious focus, only a slight decrease.

As far as we know, the percussion of the mastoid has hitherto been employed simply to determine the sensitiveness of the bone, the percussion note not being turned to account. Michael[1] experimented in this direction, it is true, but came to a negative result, and therefore prefaced his report with these words: " Percussion of the mastoid can in no way be turned to account, because in it the resonance of the buccal cavity plays so great a part that the small amount of air in the mastoid does not come into play."

The reason which Michael assigns for the uselessness of percussion does not hold, first, because when the mouth is closed a buccal cavity does not exist, and secondly, any resonance of the buccal cavity which could influence the resonance would affect it alike on both sides, and not come into consideration when we have to do with a *difference* in the resonance on the two sides. It was his general assumption that it was the presence or absence of air, caused by a filling up of the air spaces with pus, which must influence the note. This is improbable on its face, because only air in large superficial bone cavities affects the bone resonance. An abnormally distended bulla-like frontal sinus can, for example, give tympanitic resonance.[1] The air in small bone cavities, on the contrary, does not affect the resonance at all. The normal frontal sinus, which contains disproportionately more air than the most pneumatic mastoid, is not tympanitic, but exactly like any other portion of the skull covered with soft parts of like thickness.

---

[1] *Arch. für Ohrenh.*, Band xi., S. 46.

As we shall show farther on, our acceptation, *that the air consumed in the mastoid has no effect on the resonance, has been proven. The percussion sound depends much more on the resonance of the healthy or diseased bone substance itself.*

We therefore do not choose for this percussion the methods practised in examining the chest or abdomen, where we wish to test by the resonance of the air contained in the organs. In *Lücke's method of bone percussion* we seek to draw conclusions as to the condition of the bone from the resonance produced by forcible blows.[2]

Lücke succeeded, by means of percussion, in discovering carious foci when the soft parts were normal. This especially in the long bones. He percussed with a small hammer having a long tapering handle and its striking surface covered with rubber. In percussing the bone under examination, he constantly compared the note with that of the same point on the other side. His method gave thoroughly reliable results. It received, however, no extensive application for the following reason. The exploratory incision and chiselling, as practised to-day, are so free from danger, that surgeons do not feel the need for a means of determining a carious focus through the soft parts, when disease is probable from other symptoms.

We use a small metal hammer[3] for the percussion, which must always be comparative. The striking surface is 8 *mm* broad and slightly convex. The handle is 16 *cm* long and is made of a thin tapering piece of whalebone. With this hammer, by pretty forcible, even painful percussion over normal bone covered by thin skin, a loud clear osseous tone can be obtained.

---

[1] Case of Zunker, *Allgemeine Zeitschrift für Psychiatrie*, 1870–71. Band xxvii., S. 43.

[2] Lücke, *Centralblatt für Chirurgie*, 1876, S. 673, and *Arch. für klinische Chirurgie*, 1877, xxi., 838.

[3] Can be had from Dröll, Frankfurt a. M., Friedensstrasse.

A place is to be chosen on the mastoid: (1) below the linea temporalis, as this line denotes approximately the upper border of the mastoid; (2) above the insertion of the tendon of the sterno-cleido-mastoid muscle, because this thickens the covering over the bone; (3) behind the border of the auricle. Should this be drawn forward to allow more room the skin would be stretched and the resonance influenced; (4) in front of the insertion of the hair.

Only a small spot, therefore, is fit for percussion.

*Comparative percussion of course allows of a conclusion as to the condition of the bone only when the soft parts are unaltered.*

The note will of course be affected, if, as often occurs in mastoid disease, the skin is infiltrated or raised by a subcutaneous or subperiosteal abscess, or the small lymph glands over the bone are swollen. In such cases, the above-mentioned alteration of the soft parts points to bone disease, and we do not need any other aid to diagnosis.

The following experiments show how much the condition of the soft parts affects the percussion note over the above-mentioned spot. 1. Painting one side with iodine makes the note on that side duller and softer, evidently on account of the thickening of the skin due to the hyperæmia produced by the iodine. 2. Freezing the skin with ether also lowered the resonance in consequence of alteration in the consistency of the overlying skin. 3. Painting with collodium has a similar effect.

We were also able to make out a decrease in the resonance in a patient who, suffering from an acute otitis media, had put a cantharides plaster behind the ear before coming under treatment. Here the diminution was due entirely to the swelling of the soft parts. The quick recovery from the middle-ear disease, and the increase in resonance accompanying the disappearance of the cutaneous swelling, permitted the exclusion of mastoid disease.

The cutaneous œdema caused by furuncles in the meatus also diminished the resonance.

*It must be expressly stated that a one-sided perforation or accumulation of pus within the tympanum has no effect on the percussion note. Of this we have repeatedly convinced ourselves.*

If, then, an alteration in the percussion note arose without any alteration in the overlying soft parts, the cause must have lain in the bone itself.

In order to determine what changes caused diminution of resonance we made several experiments on the cadaver, the results of which here briefly follow.

## Experiments on Cadaver.

Body experimented on, that of a girl twenty-one years old, who had died of pulmonary tuberculosis. In removing the calvarium the cutaneous incision was carried down only to the level of the upper edge of the auricle. The skull was then sawed through perfectly symmetrically and higher up than usual, so that the aural region and the mastoid remained undisturbed.

While percussing, the skull was suspended each time at the middle of the frontal bone.

After the removal of the brain, percussion of both processes: No difference; R = L.

On the right side, a hole is now bored through the dura and tegmen mastoidei. Holes are then bored out in different directions from this hole, thus opening up many cavities.

These cavities are then injected with melted paraffin under strong pressure.

*After the solidification of the injected mass, percussion shows no difference, resonance still R = L.*

Process is then chiselled open from the hole drilled in tegmen. The injected mass has filled the antrum, together with the neighboring cells, the tympanic cavity, and the meatus.

Percussion : again R = L.

Removal of the injected mass, and opening up of the mastoid cells down to the tip, so that only a very thin outer wall remains.

Percussion: *dulness over the cavity.*

This cavity is filled with paraffin.

After solidification, percussion: *resonance again R = L.*

*It is evident from these experiments that a filling of the air spaces in the mastoid does not affect the resonance, that on the contrary a hollowing out of the bone diminishes the resonance.*

By the subsequent filling of the artificial cavity with paraffin, a solid material was substituted for the bone removed. This bone was the support to the outer wall upon which percussion was made, and when it was replaced again by solid material the cause of the dulness was thereby removed.

We are therefore justified in concluding, that, in our two cases where the observations were made on the living, it was not the filling of the cells with pus and granulations, but the caries of the bone that lowered the resonance.

Finally, we tried to imitate the carious process on the cadaver, by injecting the mastoid with concentrated hydrochloric acid. The body, however, was at our disposal but a few hours, and in this time the acid did not act perceptibly upon the bone.

In conclusion, we sum up the results of our observations and experiments in the following sentences: (1) *By means of Lücke's bone percussion it is possible to recognize a central ostitis of the mastoid at a time when the disease betrays itself by no externally perceptible signs.* (2) *It is the disease of the bone itself and not the obliteration of its air spaces that alters the resonance.*

# CONCERNING THE DIAGNOSTIC VALUE OF PERCUSSION OF THE MASTOID PROCESS.

By S. MOOS.

Translated by S. E. Allen, M.D.

IN the *Zeitschrift für Ohrenh.*, Bd. xxii., S. 234, Koerner and v. Wild have reported two cases of acute central caries of the mastoid.[1] In these cases Lücke's bone percussion rendered good service, inasmuch as both times external appearances of a mastoid trouble were absent. The lowering of the resonance of the bone made possible the early diagnosis of the trouble and the timely operative interference. Both cases were cured by the trepanning. Since then I have tested this recently advocated diagnostic method, and have arrived at the opinion that only a *positive* result is conclusive, a *negative* result not so. That is, an affection of the mastoid, and indeed even a severe one, can exist with no lessening of the resonance. This was shown by the operation on a case, in which we had to do with a trouble of one year's standing, with at first intermittent, but toward the end constant, violent pain. Here the outer surface of the mastoid was in a perfectly normal condition. Trepanning disclosed pus and bone necrosis. Irrigation after the operation brought away large sequestra.

---

[1] The previous article of this number, which is an unabridged translation of Koerner & Wild's paper.

# REPORT ON THE TRANSACTIONS OF THE SECTION OF OTOLOGY OF THE SIXTY-FIFTH MEETING OF THE SOCIETY OF GERMAN NATURALISTS AND PHYSICIANS HELD AT NUREMBERG FROM SEPTEMBER 11 TO SEPTEMBER 15, 1893.

By Dr. Fr. BAUER, Nuremberg.

Translated by Dr. Max Toeplitz, New York.

There were present: 1. Fischenich, Wiesbaden. 2. Prof. Barth, Marburg. 3. Prof. Habermann, Graz. 4. Lecturer Lichtenberg, Budapest. 5. Beleites, Halle. 6. Lecturer Kayser, Breslau. 7. Levy, Hagenau. 8. Lecturer Bloch, Freiburg-i-B. 9. Mayer, Nuremberg. 10. Prof. Zaufal, Prague. 11. Lecturer Rohrer, Zurich. 12. Davidsohn, Berlin. 13. Ulrichs, Halle. 14. Robitzsch, Leipzic. 15. Prof. Gradenigo, Turin. 16. Schubert, Nuremberg. 17. Bauer, Nuremberg. 18. Aldinger, Fürth. 19. Meyerson, Warsaw. 20. Scheibe, Munich. 21. Joël, Gotha. 22. Schmaltz, Dresden. 23. Brüne, Hannover. 24. Stiel, Nuremberg. 25. Prof. Hartmann, Berlin. 26. Koerner, Frankfort-o-M. 27. Prof. Bezold, Munich. 28. Howe, Buffalo, U. S. A. 29. Thost, Hamburg. 30. Schuler, Wiesbaden. 31. Steinberg, Franzensbad, San Remo.

## FIRST MEETING, SEPTEMBER 11TH.

President: Schubert, Nuremberg.
Secretary: Bauer, Nuremberg.

Rohrer, Zurich, reads a paper on *anomalies of formation of the auricle.*

Kayser, Breslau, reports a case of *affection of the acoustic nerve after CO-poisoning.* The examination of the patient, a woman,

with extreme deafness and tinnitus, revealed, in addition to the normal condition of the membrana tympani, all functional signs of an affection of the sound-perceiving apparatus. Faradisation improved her rapidly. The affection was undoubtedly caused by an extravasation, analogous to other modes of action of CO. Such an isolated affection of the hearing organ in CO-poisoning has heretofore not been observed.

### SECOND MEETING, SEPTEMBER 12TH.

President : ZAUFAL, Prague.

SCHEIBE, Munich, demonstrated : (1) *A fibroma of the entrance of the external auditory meatus.* (2) *An osteo-sarcoma of the external meatus.* (3) Two cases of *hairy granulation tumor of the middle ear.* The author gives in all cases the result of a careful histological examination, and demonstrates the microscopical specimens. Finally, he reports the result of the histological examination of a case of *sclerosis*, and demonstrates the specimens and drawings. The foundation of the sclerosis was in this case formed by new-formation of osseous tissue, which was confined to the surrounding of the oval window, and had produced an extensive adhesion of the stapes to the pelvis ovalis. Scheibe emphasizes the difference between sclerosis and the rare cases of chronic dry otitis media with sunken drum membrane ; in the latter the affection has undoubtedly been transferred from the Eustachian tube. He cannot give a definite explanation for the cause of new-formation of bony tissue in his case.

In the discussion, HABERMANN, Graz, mentions a new case of sclerosis, in which he has found microscopical changes analogous to those of Scheibe's case. He believes that the process originates in a chronic inflammation of the mucous membrane of the tympanic cavity.

ROHRER, Zurich, reads a paper on *perception of high and low tones in affections of the labyrinth and the n. acusticus.* He observed in certain forms of affections of the Eustachian tube and middle ear, principally in young individuals, in addition to extreme deafness for speech and loss of bone-conduction, preservation of high tones, and has described this condition as torpor of the acoustic nerve. His statistics resulted in the fact that the average age of torpor patient is below twenty-five years in sixty per cent of the

cases, and on the whole average twenty-seven years, whilst the average age in affections of the labyrinth is thirty-eight years.

In the discussion, GRADENIGO, Turin, considers the torpor n. acustici as hypo-æsthesia n. acustici of hysterical character, associated with organic lesions of the middle ear.

GRADENIGO, Turin, then discusses the *pathogenesis of otitis interna in general.* He finds in all cases of otitis interna, apart from those produced by traumatism and morbid processes in the cerebral cavity, as predisposing element a more or less marked affection of the middle ear, and indirectly of the naso-pharyngeal cavity. Two agents of etiological importance are: (1) the existence of a general hereditary or acquired infection of the organism; and (2) the hereditary disposition to aural affections. He, therefore, emphasizes principally two affections, viz., hysteria and hereditary syphilis, principally in its late forms.

LEVY, Hagenau, demonstrates the acoumeter devised by him. It serves for examination of aërial conduction, and depends upon the perception of the sound of the falling water drop, the intensity of which differs according to the altitude of the fall. The speaker, with his acoumeter, the use of which depends upon certain conditions, and is not attended to without difficulty, has made extensive examinations upon school children and prisoners, which prove the extremely sharp hearing in childhood, decreasing with advancing age, and demonstrates that isolation sharpens the hearing of prisoners.

## THIRD MEETING, SEPTEMBER 12TH.

President: BARTH, Marburg.

ZAUFAL, Prague: ***Contribution to the cure of otitic sinus thrombosis, with demonstration of microscopical specimens.*** This was a case of extensive suppuration between dura and the bones of the skull, following otitis media purulenta without perforation. The cerebrum was punctured through the inflamed dura; exitus after two days. The post-mortem revealed extensive thrombosis of the sigmoid and transverse sinuses, the thrombus throughout organized, with purulent disintegration, as it was demonstrated from the microscopical specimens. A peculiarity of the case was the abundance of hyaline globules in the inflamed tissue of the dura, in its granulations, wellnigh 2 *cm* high, and in all layers of the inflamed membrana tympani,

### FOURTH MEETING, SEPTEMBER 14TH.

President: GRADENIGO, Turin.

GRADENIGO, Turin: *Association of hysteria with organic diseases of the ear.* Speaker treats of organic lesions of the ear, associated with nervous symptoms, a form of symptoms which have heretofore not been particularly considered by aurists.

Apart from otalgia, which, connected with slight catarrh of the middle ear, is of most frequent occurrence, we find in hysterical individuals particularly, acoustic hypo- and hyperæsthesia, associated with hypo- and hyperæsthesia of the skin of adjoining parts, the external meatus and the auricle. They have the functional character of alteration of perception; they differ, however, from the lesions of the labyrinth. Decrease of acuteness of hearing for high tones is about as frequent as for low tones, disturbances of equilibrium, etc., are missing. Slight inflammatory symptoms of the middle ear are always predisposing. Based upon this supposition of Gradenigo, certain seemingly paradoxical clinical observations in cases of severe or complete deafness are readily explained. A complete bibliography is given.

In the discussion BARTH, Marburg, doubts the frequency of occurrence of hysterical aural affections. Contradictions of the functional examination are frequent in lues and particularly after traumatisms, but the imperfection of the examination is frequently here at fault.

ZAUFAL, in diagnosing hysterical hardness of hearing or deafness, lays the main stress not only upon the variety of symptoms in the hearing organ, but also in other organs of sense, and generally in other organs.

GRADENIGO replied to Barth, that he considers hysterical and traumatic neuroses as being closely related conceptions.

BLOCH, Freiburg, and HABERMANN, Graz, also take part in the discussion.

BEZOLD, Munich, then makes his *preliminary communications on the examination of the pupils of the institution for the deaf and dumb at Munich.* He has examined the pupils with reference to the remaining hearing faculty, with a continuous series of tones ranging from $C^2$ with 16 vibrations to the upper limit of Galton's whistle. The extremely interesting results not being adapted to a brief review, Bezold reserves to himself to publish the conclusions deduced therefrom in another elaborate paper.

Bloch, Freiburg, Barth, Marburg, and Gradenigo, Turin, discuss the paper.

Bezold then demonstrates the continuous series of tones in its new form, improved by Dr. Edelmann. It consists of a series of tuning-forks, the lowest five of which are made of bell metal; the smaller ones in the middle extent of the tone scale are of steel; the series ends above with $a^2$, which is followed by two whistles, covered with a lid, and by Galton's small whistle. Edelmann's improvement consists in the construction of the low tuning-forks out of bell metal, which considerably increases their manageability; furthermore, in a change of form of the sliding weights, thus obviating the disturbing sensation of cold at the ear of the examined person, produced by the vibrations of the tuning-fork; and finally in the exact denotation of the pitch upon every tuning-fork according to tones and vibratory figures at sufficiently small intervals.

In the discussion Habermann, Graz, mentions Appun's wire tuning-forks.

Meyerson, Warsaw, then reads his paper on *objectively perceptible ear noises.* He divides them into entotic noises and those propagated from other organs. The former are usually of muscular origin, or they may be produced by movement of the labia of a defect of the membrana tympani. The latter are rare and of vascular origin. The author communicates two cases in which the noise was perceptible through the otoscope and through the stethoscope placed upon the skull. In the first case the diagnosis wavered between aneurysm of the internal carotid and cerebral tumor, and in consideration of the fact that compression of the common carotid permanently stayed the noise, the internal carotid was ligated. The result was negative, since the noise returned after four hours. In the second case, there existed a venous noise, which was objectively perceptible in a very anæmic patient, disappeared on pressure upon the cervical veins of the affected side, and had the character of the so-called nun-murmur.

In the discussion, Barth, Marburg, reports the history of his own case, then Fischenich, Wiesbaden, and Zaufal, Prague, also take part.

Schubert, Nuremberg, demonstrates the magnifying glass devised by him for the membrana tympani. In order to produce the greatest possible enlargement, he places the lens on the point of the aural speculum. In order to eliminate the disturbing reflexes, which by placing the lens obliquely is only imperfectly done, Schubert has combined a plano-convex lens with a prism, which throws the reflex far sideways and out of the field of vision. Schubert then demonstrates a series of gelatine-glycerine specimens of the ear with reference to his former publication of this method of embedding (*Arch. f. Ohrenheilk.*, vol. xxx., p. 295). He then invites the members of the section to inspect his private clinic.

### FIFTH MEETING, SEPTEMBER 14TH.

(Together with Section xxi., laryngology and rhinology.)

President: ZAUFAL, Prague.
Secretary: BAUER, Nuremberg.

HARTMANN, Berlin, ***demonstrates*** by means of ***a sciopticon, photographic illustrations*** of specimens on the anatomical relations of the frontal sinus and its openings, then of Highmore's antrum and its entrance, pathological specimens of this cavity, new-formations and pathological specimens of the nasal cavity, anomalies of the nasal septum, and finally normal and pathological specimens of the hearing organ. Hartmann then demonstrates his apparatus, consisting of an elastic steel bow with attachment over the head for fixation of electrodes in the nose during the application of electrolysis and a number of instruments, principally scissors and cutting forceps, for the correction of deviations of the septum, and he discusses his method of partial resection of the septum.

FISCHENICH, Wiesbaden, reads a paper on ***hæmatoma and primary perichondritis of the nasal septum.*** In the former affection, a trauma of the nasal dorsum is of etiological importance. The diagnosis is supported, apart from the history, by the usually univocal objective result of examination or eventually by the exploratory puncture. The prognosis is also cosmetically favorable. With reference to the treatment, Fischenich, on account of his own observations, favors extensive bilateral incision with subsequent plugging. Furthermore, Fischenich reports two cases of primary perichondritis of the septum, which he had but recently observed. In the first case the original cause could not be ascertained, in the second a periostitis of the alveolar process of the upper maxilla was the cause of the nasal affection. Multiple punctures were conducive to complete recovery in both cases.

# REPORT ON THE PROGRESS OF OTOLOGY DURING THE FIRST HALF OF THE YEAR 1893.

## I.—NORMAL AND PATHOLOGICAL ANATOMY, HISTOLOGY, AND PHYSIOLOGY OF THE EAR AND NASO-PHARYNX.

By Prof. AD. BARTH, Marburg.

Translated by Dr. Max Toeplitz, New York.

### A.—ANATOMY.

### *a*.—HEARING ORGAN.

1. Schroeder, A. Investigations on the vascular system of the external ear. Inaugural Dissertation, Jena, 1892.

2. Prof. Gradenigo. Malformations of the auricle. *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 281, 1893.

3. Vali, E. Examinations of criminals upon morphological changes of the auricle. *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 315, 1893.

4. Ostmann. The dependence of the form of the external meatus upon the form of the skull. *Monatschr. f. Ohrenheilk.*, etc., 1893, p. 57.

5. Darkschewitch and Tichonow. Contribution to the study of the pathologico-anatomical alterations in peripheral paralysis of the facial nerve of non-specific origin. *Neurol. Centralbl.*, 1893, p. 329.

6. Ayers, H. The peripheral relation of the acoustic nerve and the value of the hair cells of the hearing organ. *Anat. Anz.*, 1893, p. 435.

7. Krepuska. A case of primary tumor of the acoustic nerve with demonstration of macroscopical and microscopical specimens.

Ber. d. med. Gesellsch. at Buda-Pest, meeting of April 8, 1893. *Prag. med. Wochenschr.*, 1893, No. 16.

1. SCHROEDER lays the greatest stress on the excellent and instructive illustrations of his publication. The details of the description are essentially of theoretical interest.

2. GRADENIGO cites and partially illustrates his own observations of malformations of the auricle, of which he describes: absence, polyotia, præauricular appendices, and congenital fistulæ with especial reference to former publications on the subject.

3. VALI examined the abnormities of the auricle of 500 male and 324 female criminals, and compared the results with former examinations of 1000 normal individuals. Hence follows, that in weak-minded persons, idiots, and criminals, morphological changes of the auricle occur much more frequently; that among these anomalies particularly the more important ones are more numerous; and finally, that these anomalies are among the weak-minded, idiots, and criminals of much greater frequency in males than in females of the same classes. One and the same individual also exhibits on an average more anomalies than a normal person.

4. Apart from exceptions one may assert, that the form of the calibre of the external meatus depends upon the form of the skull, so as to attribute in general the more circular meatus to the dolichocephalic skull and the longest oval meatus to the brachycephalic. The examinations were made on 2302 racial skulls.

5. The authors examined the facial nerve of a woman, aged fifty-nine, who, about a year previous to her death had been affected, in consequence of a carious-necrotic process in the middle ear, with total paralysis of all branches of the facial. Peripherally from the ganglion geniculi, parenchymatous neuritis was found; thence up to the nucleus, in the first place, the signs of secondary degeneration. The nucleus also shows marked signs of simple atrophy without indications of inflammatory process. The atrophy of the nucleus is justly considered as consequence of infectious neuritis.

6. AYERS stains according to Golgi's method and explains the superiority of his results over those of Retzius and von Gehuchten, by the superior staining of his specimens. He sums up as follows: (1) The hair cells and ganglionic cells form one morphological unity, an acoustic element, mediating between superficial and central points. (2) There exists no fundamental difference between acoustic and olfactory elements. (3) The so-called "spiral

fibres" are but short portions of radiary fibres reaching their object through a circuitous path. (4) All fibres of the acoustic, as far as it is positively ascertained, originate in the hair cells (from the centre of the base of every cell a nerve fibre arises, which, under favorable conditions, may be followed through a cell of the cochlear ganglion). (5) In the embryos of all mammals, the acoustic, during a certain stage, is formed of nerve fibres, which originate in the sauropsida organ (the later sulcus internus), and with its loss and the simultaneous development of Corti's organ, the acoustic is transferred to the latter and its composition is thereby altered.

7. This is a case of glioma of the right acoustic, which had implicated the cerebellum and internal ear.

### *b.*—NASO-PHARYNX.

1. ONODI, A. The nasal cavity and its accessory cavities. From anatomical sections represented in twelve tables. *I. Hölder*, Vienna.

2. SPURGAT, F. The regular forms of the nasal cartilage of man when completely developed. (From the Anatom. Institute at Freiburg.) *Anat. Anzeiger*, 1893, p. 228.

3. EDINGER, L. Comparative embryological and anatomical studies of the cerebrum. 3. Olfactory apparatus and cornu Ammonis. *Anat. Anzeiger*, 1893, pp. 305-321.

4. HARTMANN, A. The anatomical relations of the frontal sinus and its orifice. *Arch. f. klin. Chirurgie*, vol. xlv., 1.

1. Every nasal cartilage is enveloped by an especial cartiaginous sheath. They are best divided into: (1) septum narium, cartilagineum, (2) tegmen narium cartilagineum, (3) annulus cartilagineus aperturæ narium, (4) cartilagines basales narium. Dispersed portions of cartilage occur in different ways, which cannot be particularly denoted. The single forms and their connection with each other are elaborately described.

3. EDINGER could prove, in lizards, blind worms, and three kinds of turtle, the presence of a genuine cornu Ammonis and its connection by means of fibres with the olfactory apparatus. He proposes to call these tracts, advancing caudally from the olfactory bulb, in the future, olfactory radiation, distinguishing the lateral and the medial radiation. In all reptiles examined, the lateral olfactory fascicle enters, reaching it from in front, the ventral

side of the cornu Ammonis. The cortical termination is thus positively proven. An elaborate description of the anatomical relations of the anterior cerebrum follows, which concludes as follows: Phylogenetically before any other nerve, the olfactory sends tracts to the higher cerebral centres. They still terminate, in fishes, in the trunk area, but rise in amphibia to the rudimentary cortex of the mantle, and meet still in amphibia a well developed formation of the cortex. This presents the characters and location of the formation of the cortical cornu Ammonis with which we are familiar in mammals. In the latter even the olfactory cortex shows unusual development and complication. We are to-day justified in the belief that the cerebral cortex is the agent of high psychical functions. It follows from the foregoing results that the phylogenetically oldest cortical action is attached to the olfactory perception. (Important for the localization of otitic abscess. H. K.)

## B.—PHYSIOLOGY AND PHYSICS.

### *a.*—HEARING ORGAN.

1. BONNIER, M. P. The tubo-tympanic functions. Note, presented by Giard. *Compt. rend. des séances de la Soc. de Biol.*, Nov. 26, 1892.

2. BONNIER, M. P. The otolithic functions. Note, *ibid.*, Feb. 18, 1893.

3. BONNIER, M. P. The otocystic functions. Note, *ibid.*, April 15, 1893.

4. CHARLESK. The localization of the hearing centre. *Brain*, 1892, p. 465.

5. CUPERUS, N. J. The upper and lower tone limits of the hearing organ. Inaugural Dissertat., Leiden, 1893.

6. GALTON, FR., and GRUBER, ED. (Jassy). Colored hearing and similar phenomena. Congress of Experimental Psychology at London, 1892 (*Rev. Neurol. Centralbl.*, 1893, p. 231).

7. KRIGER-MENZEL, O., and RAPS, A. The movement of pulled chords. *Sitzungsber. d. K. Preuss. Acad. d. Wiss.*, 1893, vol. xxix., p. 509.

1, 2, 3. Description of the manner in which the Eustachian tube, the tympanum, otoliths, and otocysts assist in the function of the apparatus of equilibrium.

# REPORT ON THE TRANSACTIONS OF THE SECTION OF OTOLOGY OF THE SIXTY-FIFTH MEETING OF THE SOCIETY OF GERMAN NATURALISTS AND PHYSICIANS HELD AT NUREMBERG FROM SEPTEMBER 11 TO SEPTEMBER 15, 1893.

By Dr. Fr. BAUER, Nuremberg.

Translated by Dr. Max Toeplitz, New York.

There were present: 1. Fischenich, Wiesbaden. 2. Prof. Barth, Marburg. 3. Prof. Habermann, Graz. 4. Lecturer Lichtenberg, Budapest. 5. Beleites, Halle. 6. Lecturer Kayser, Breslau. 7. Levy, Hagenau. 8. Lecturer Bloch, Freiburg-i-B. 9. Mayer, Nuremberg. 10. Prof. Zaufal, Prague. 11. Lecturer Rohrer, Zurich. 12. Davidsohn, Berlin. 13. Ulrichs, Halle. 14. Robitzsch, Leipzic. 15. Prof. Gradenigo, Turin. 16. Schubert, Nuremberg. 17. Bauer, Nuremberg. 18. Aldinger, Fürth. 19. Meyerson, Warsaw. 20. Scheibe, Munich. 21. Joél, Gotha. 22. Schmaltz, Dresden. 23. Brüne, Hannover. 24. Stiel, Nuremberg. 25. Prof. Hartmann, Berlin. 26. Koerner, Frankfort-o-M. 27. Prof. Bezold, Munich. 28. Howe, Buffalo, U. S. A. 29. Thost, Hamburg. 30. Schuler, Wiesbaden. 31. Steinberg, Franzensbad, San Remo.

## FIRST MEETING, SEPTEMBER 11TH.

President: Schubert, Nuremberg.
Secretary: Bauer, Nuremberg.

Rohrer, Zurich, reads a paper on *anomalies of formation of the auricle.*

Kayser, Breslau, reports a case of *affection of the acoustic nerve after CO-poisoning.* The examination of the patient, a woman,

with extreme deafness and tinnitus, revealed, in addition to the normal condition of the membrana tympani, all functional signs of an affection of the sound-perceiving apparatus. Faradisation improved her rapidly. The affection was undoubtedly caused by an extravasation, analogous to other modes of action of CO. Such an isolated affection of the hearing organ in CO-poisoning has heretofore not been observed.

### SECOND MEETING, SEPTEMBER 12TH.

President : Zaufal, Prague.

Scheibe, Munich, demonstrated : (1) *A fibroma of the entrance of the external auditory meatus.* (2) *An osteo-sarcoma of the external meatus.* (3) Two cases of *hairy granulation tumor of the middle ear.* The author gives in all cases the result of a careful histological examination, and demonstrates the microscopical specimens. Finally, he reports the result of the histological examination of a case of *sclerosis*, and demonstrates the specimens and drawings. The foundation of the sclerosis was in this case formed by new-formation of osseous tissue, which was confined to the surrounding of the oval window, and had produced an extensive adhesion of the stapes to the pelvis ovalis. Scheibe emphasizes the difference between sclerosis and the rare cases of chronic dry otitis media with sunken drum membrane ; in the latter the affection has undoubtedly been transferred from the Eustachian tube. He cannot give a definite explanation for the cause of new-formation of bony tissue in his case.

In the discussion, Habermann, Graz, mentions a new case of sclerosis, in which he has found microscopical changes analogous to those of Scheibe's case. He believes that the process originates in a chronic inflammation of the mucous membrane of the tympanic cavity.

Rohrer, Zurich, reads a paper on *perception of high and low tones in affections of the labyrinth and the n. acusticus.* He observed in certain forms of affections of the Eustachian tube and middle ear, principally in young individuals, in addition to extreme deafness for speech and loss of bone-conduction, preservation of high tones, and has described this condition as torpor of the acoustic nerve. His statistics resulted in the fact that the average age of torpor patient is below twenty-five years in sixty per cent of the

# REPORT ON THE TRANSACTIONS OF THE SECTION OF OTOLOGY OF THE SIXTY-FIFTH MEETING OF THE SOCIETY OF GERMAN NATURALISTS AND PHYSICIANS HELD AT NUREMBERG FROM SEPTEMBER 11 TO SEPTEMBER 15, 1893.

BY DR. FR. BAUER, NUREMBERG.

Translated by Dr. MAX TOEPLITZ, New York.

There were present: 1. FISCHENICH, Wiesbaden. 2. Prof. BARTH, Marburg. 3. Prof. HABERMANN, Graz. 4. Lecturer LICHTENBERG, Budapest. 5. BELEITES, Halle. 6. Lecturer KAYSER, Breslau. 7. LEVY, Hagenau. 8. Lecturer BLOCH, Freiburg-i-B. 9. MAYER, Nuremberg. 10. Prof. ZAUFAL, Prague. 11. Lecturer ROHRER, Zurich. 12. DAVIDSOHN, Berlin. 13. ULRICHS, Halle. 14. ROBITZSCH, Leipzic. 15. Prof. GRADENIGO, Turin. 16. SCHUBERT, Nuremberg. 17. BAUER, Nuremberg. 18. ALDINGER, Fürth. 19. MEYERSON, Warsaw. 20. SCHEIBE, Munich. 21. JOÉL, Gotha. 22. SCHMALTZ, Dresden. 23. BRÜNE, Hannover. 24. STIEL, Nuremberg. 25. Prof. HARTMANN, Berlin. 26. KOERNER, Frankfort-o-M. 27. Prof. BEZOLD, Munich. 28. HOWE, Buffalo, U. S. A. 29. THOST, Hamburg. 30. SCHULER, Wiesbaden. 31. STEINBERG, Franzensbad, San Remo.

## FIRST MEETING, SEPTEMBER 11TH.

President: SCHUBERT, Nuremberg.
Secretary: BAUER, Nuremberg.

ROHRER, Zurich, reads a paper on *anomalies of formation of the auricle.*

KAYSER, Breslau, reports a case of *affection of the acoustic nerve after CO-poisoning.* The examination of the patient, a woman,

with extreme deafness and tinnitus, revealed, in addition to the normal condition of the membrana tympani, all functional signs of an affection of the sound-perceiving apparatus. Faradisation improved her rapidly. The affection was undoubtedly caused by an extravasation, analogous to other modes of action of CO. Such an isolated affection of the hearing organ in CO-poisoning has heretofore not been observed.

### SECOND MEETING, SEPTEMBER 12TH.

President : ZAUFAL, Prague.

SCHEIBE, Munich, demonstrated : (1) *A fibroma of the entrance of the external auditory meatus.* (2) *An osteo-sarcoma of the external meatus.* (3) Two cases of *hairy granulation tumor of the middle ear.* The author gives in all cases the result of a careful histological examination, and demonstrates the microscopical specimens. Finally, he reports the result of the histological examination of a case of *sclerosis*, and demonstrates the specimens and drawings. The foundation of the sclerosis was in this case formed by new-formation of osseous tissue, which was confined to the surrounding of the oval window, and had produced an extensive adhesion of the stapes to the pelvis ovalis. Scheibe emphasizes the difference between sclerosis and the rare cases of chronic dry otitis media with sunken drum membrane ; in the latter the affection has undoubtedly been transferred from the Eustachian tube. He cannot give a definite explanation for the cause of new-formation of bony tissue in his case.

In the discussion, HABERMANN, Graz, mentions a new case of sclerosis, in which he has found microscopical changes analogous to those of Scheibe's case. He believes that the process originates in a chronic inflammation of the mucous membrane of the tympanic cavity.

ROHRER, Zurich, reads a paper on *perception of high and low tones in affections of the labyrinth and the n. acusticus.* He observed in certain forms of affections of the Eustachian tube and middle ear, principally in young individuals, in addition to extreme deafness for speech and loss of bone-conduction, preservation of high tones, and has described this condition as torpor of the acoustic nerve. His statistics resulted in the fact that the average age of torpor patient is below twenty-five years in sixty per cent of the

# REPORT ON THE TRANSACTIONS OF THE SECTION OF OTOLOGY OF THE SIXTY-FIFTH MEETING OF THE SOCIETY OF GERMAN NATURALISTS AND PHYSICIANS HELD AT NUREMBERG FROM SEPTEMBER 11 TO SEPTEMBER 15, 1893.

By Dr. Fr. BAUER, Nuremberg.

Translated by Dr. Max Toeplitz, New York.

There were present: 1. **Fischenich**, Wiesbaden. 2. Prof. **Barth**, Marburg. 3. Prof. **Habermann**, Graz. 4. Lecturer **Lichtenberg**, Budapest. 5. **Beleites**, Halle. 6. Lecturer **Kayser**, Breslau. 7. **Levy**, Hagenau. 8. Lecturer **Bloch**, Freiburg-i-B. 9. **Mayer**, Nuremberg. 10. Prof. **Zaufal**, Prague. 11. Lecturer **Rohrer**, Zurich. 12. **Davidsohn**, Berlin. 13. **Ulrichs**, Halle. 14. **Robitzsch**, Leipzic. 15. Prof. **Gradenigo**, Turin. 16. **Schubert**, Nuremberg. 17. **Bauer**, Nuremberg. 18. **Aldinger**, Fürth. 19. **Meyerson**, Warsaw. 20. **Scheibe**, Munich. 21. **Joél**, Gotha. 22. **Schmaltz**, Dresden. 23. **Brüne**, Hannover. 24. **Stiel**, Nuremberg. 25. Prof. **Hartmann**, Berlin. 26. **Koerner**, Frankfort-o-M. 27. Prof. **Bezold**, Munich. 28. **Howe**, Buffalo, U. S. A. 29. **Thost**, Hamburg. 30. **Schuler**, Wiesbaden. 31. **Steinberg**, Franzensbad, San Remo.

## FIRST MEETING, SEPTEMBER 11TH.

President: **Schubert**, Nuremberg.
Secretary: **Bauer**, Nuremberg.

**Rohrer**, Zurich, reads a paper on *anomalies of formation of the auricle.*

**Kayser**, Breslau, reports a case of *affection of the acoustic nerve after CO-poisoning.* The examination of the patient, a woman,

with extreme deafness and tinnitus, revealed, in addition to the normal condition of the membrana tympani, all functional signs of an affection of the sound-perceiving apparatus. Faradisation improved her rapidly. The affection was undoubtedly caused by an extravasation, analogous to other modes of action of CO. Such an isolated affection of the hearing organ in CO-poisoning has heretofore not been observed.

### SECOND MEETING, SEPTEMBER 12TH.

President : ZAUFAL, Prague.

SCHEIBE, Munich, demonstrated : (1) *A fibroma of the entrance of the external auditory meatus.* (2) *An osteo-sarcoma of the external meatus.* (3) Two cases of *hairy granulation tumor of the middle ear.* The author gives in all cases the result of a careful histological examination, and demonstrates the microscopical specimens. Finally, he reports the result of the histological examination of a case of *sclerosis*, and demonstrates the specimens and drawings. The foundation of the sclerosis was in this case formed by new-formation of osseous tissue, which was confined to the surrounding of the oval window, and had produced an extensive adhesion of the stapes to the pelvis ovalis. Scheibe emphasizes the difference between sclerosis and the rare cases of chronic dry otitis media with sunken drum membrane; in the latter the affection has undoubtedly been transferred from the Eustachian tube. He cannot give a definite explanation for the cause of new-formation of bony tissue in his case.

In the discussion, HABERMANN, Graz, mentions a new case of sclerosis, in which he has found microscopical changes analogous to those of Scheibe's case. He believes that the process originates in a chronic inflammation of the mucous membrane of the tympanic cavity.

ROHRER, Zurich, reads a paper on *perception of high and low tones in affections of the labyrinth and the n. acusticus.* He observed in certain forms of affections of the Eustachian tube and middle ear, principally in young individuals, in addition to extreme deafness for speech and loss of bone-conduction, preservation of high tones, and has described this condition as torpor of the acoustic nerve. His statistics resulted in the fact that the average age of torpor patient is below twenty-five years in sixty per cent of the

the mastoid antrum was opened and, by removal of the posterior wall of the external meatus, turned into a flat fossa.

NOLTENIUS.

18. ALDERTON treats of seborrhœic affections of the ear under the heads of: 1, seborrhœa oleosa; 2, seborrhœa sicca; 3, comedo; 4, sebaceous cysts; 5, sebaceous adenomata. Several drawings are given of sebaceous cysts of the auricle and canal.

SWAN M. BURNETT.

### MIDDLE EAR.

19. ROBERTS, N. S. Pyoktanin in ear disease. *N. Y. Med. Record*, January 28, 1893.

20. BRAISLIN, WM. C. Otitis media purulenta, following an amputation of the uvula. *N. Y. Med. Journ.*, March 4, 1893.

21. WILSON, HAROLD. Vibratory massage of the middle ear by means of the telephone. *N. Y. Med. Journ.*, Feb. 25, 1893.

22. HEWETT, JAMES. Adenoid growths as a cause of ear disease in children. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1893.

23. BING, Vienna. Contribution to the treatment of inflammation of the mastoid portion of the petrous bone in otitis media. *Centralb. f. Therapie*, June, 1893.

24. BRUNNER, G. Experience in otology. *Correspondenzblatt für Schweizer Aerzte*, 1893, p. 161.

25. BONNIER. Bilious otorrhœa. *Soc. laryng. de Paris*, 4, x., 1892.

26. FERRERI. Caries necrotica and formation of sequestra in the petrous bone of children. *Archivio Ital. di Otologia*, etc., i., p. 201.

27. SEXTON, SAMUEL. Remarks on otoscleronectomy and otonecronectomy. *Med. Record.*

28. DENCH, E. B. Operative measures for the relief of chronic suppurative and non-suppurative inflammation of the tympanum, the indications for the employment of such measures, and the results obtained. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1893.

29. FRIEDENWALD, HENRY. Cholesteatoma of the ear. *Med. News*, March 11, 1893.

30. ADAMS, JOHN L. Report of fifteen cases of mastoiditis treated at the N. Y. Eye and Ear Infirmary, during the period

from March, 1892, to September, 1892. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1893.

31. Prof. E. DE ROSSI, Rome. Surgery of the middle ear. *Ibid.*, p. 105.

32. PANSE. Stacke's method of operation for the opening of the middle ear, during the first year of its use at the aural clinic at Halle. *Arch. f. Ohrenheilk.*, xxxiv., p. 248.

33. SIEBENMANN, Bâle. The radical operation for cholesteatoma by wide permanent openings, simultaneously toward the external meatus and the retro-auricular region. *Berl. klin. Wochenschr.*, Nos. 1 and 2, 1893.

34. GRUNERT. Aural cholesteatoma, a paper written to supplement that of Prof. Siebenmann, of Bâle, on the radical operation of cholesteatoma. *Ibid.*, No. 14, 1893.

35. MAUREL, M. PIERRE. Opening of the tympanic cavity according to Küster's Method. *Revue de laryng.*, etc., No. 5. 1893.

36. MARCHAND, GÉRARD. The septico-pyæmic complications in otitis. *Semaine Méd.*, June 28, 1893.

37. EULENSTEIN, Frankfort-on-the-Main. Pyæmic metastases in acute affections of the temporal bone. *Monatsschr. f. Ohrenheilk.*, No. 6, 1893.

38. BIRCHER, H. Phlebitis of the lateral, inferior petrosal, and cavernous sinuses. Opening and disinfection after removal of the pyramid of the temporal bone. Recovery. *Centralbl. f. Chirurgie*, No. 22, 1893.

39. PRITCHARD, URBAN, and CHEATLE, LENTHAL. Pyæmic thrombosis. Operation. *Lancet*, March 4, 1893.

40. KOSSEL, H. A case of tuberculous caries of the petrous bone, with sinus thrombosis and consequent development of general miliary tuberculosis. *Charité-Annalen.*, vol. 137.

41. LANZ, O. A case of deep-seated cerebral abscess. *Correspondenzblatt für Schweizer Aerzte*, pp. 129 and 166, 1893.

42. KIRCHNER, Würzburg. A case of purulent meningitis after otitis media with rapid exitus letalis. *Berl. klin. Wochenschrift*, No. 23, 1893.

19. After a fair trial, ROBERTS concludes that pyoktanin has no advantages over any of the commonly used remedies in ear diseases.

SWAN M. BURNETT.

20. In the case related by **Braislin**, he thinks there may be a connection between a purulent otitis media, which appeared in a consumptive some days after the amputation of the uvula to relieve a cough, and the operation. **Swan M. Burnett.**

21. **Wilson** has made use of the hand telephone of Bell, connected with a Faradic current, and so arranged as to give vibrations from the softest to the very loudest, as a method of massage in middle-ear disease, and in the four cases which he reports there was no benefit except some diminution in the tinnitus. For the purposes of massage he considers this method superior to Maloney's otophone or the phonograph.

**Swan M. Burnett.**

22. **Hewett** thinks that, in the majority of cases of middle-ear disease of all kinds in children, an examination will reveal the presence of adenoid disease which acts as chief cause in their production. **Swan M. Burnett.**

23. **Bing**, in the treatment of otitis media, mainly emphasizes, for the prevention of its extension into the mastoid cells, strict antiphlogosis from the beginning of otitis until the acme is passed. Early mastoid operation is pleaded only in dyscrasic individuals with presumably pneumatic mastoid processes, whilst diploëtic ones are not operated upon, unless urged by extreme pain and continuous high fever. **Pollak.**

24. In the paper written for the general practitioner, **Brunner** argues also against polypragmaty in otitis media purulenta acuta, and against the unfortunate attempts at "harmonizing" its treatment with bacteriological investigations. Furthermore, the author's advice on the necessity of absolute rest, either by confinement to the room or even to the bed, is indeed worthy of recommendation. In acute, as well as in chronic suppurative otitis media, Brunner uses zinc. sulfuric. as "an old efficacious remedy," and also boric acid. We emphasize also Brunner's frequent observation of transition of marked catarrh of the middle ear (mostly with naso-pharyngeal catarrh) into pronounced sclerosis in the course of time. **Siebenmann.**

25. A cirrhotic patient was affected with otitis. The character of the otorrhœa changed with the icterus. At the onset, the suppuration hardly exhibited a greenish tint, but the aural discharge became greener according to the increase of the green hue in other secretions (sputum, tears, nasal mucus). During agony, the icterus disappeared and withal, the otorrhœa appeared yellow, thick without the green hue. **Gellé.**

26. **Ferreri** reports two cases of labyrinth necrosis, and discusses the result of his histological investigations in caries of the temporal bone. According to the author it is quite probable that the caries begins with the development of the affection of the soft parts. He finally recommends the use of a ten per cent solution of chlor. zinc, to be applied with a cotton pellet to the affected bone. Six observations prove the efficacy of the remedy. Gradenigo.

27. **Sexton** in this short paper simply reiterates his belief in the usefulness of removing the ossicles, not only when necrotic, but also for the relief of the troublesome symptoms of sclerosing catarrh of the middle ear. Swan M. Burnett.

28. **Dench** reports the results of 24 cases of chronic suppurative otitis operated on by removal of the ossicles. In 14 the discharge was stopped, in 8 much reduced, 2 are still under observation. In 14 the hearing was improved, in 9 it remained the same and in one was apparently reduced. In 6 cases the malleus alone was removed ; the malleus and incus in 11 cases, and the three ossicles in 3. In 2 cases all the ossicles had been destroyed. Nine operations were made on an intact membrane. In these the hearing was greatly improved in 4 cases, slightly in 4, and not in 1. A clear description of the method of operating is given which is too elaborate for abstraction. The instruments used are figured. He carefully examines the relation between air- and bone-conduction, and considers this as furnishing important information as to the indication for an operation. He uses a series of forks from 128 to 2048 vibrations devised by A. Hartmann, and considers evidence found by this examination showing involvement of the nervous apparatus as contra-indicating the operation in a greater or less degree for the purpose of improving the hearing. He deems the removal of the ossicles often indicated for drainage effect. He has found operating on one ear to be followed by an improvement in the hearing power in the other so often that he can not regard it as a mere coïncidence. Swan M. Burnett.

29. **Friedenwald** here relates the histories of three cases of excessive epithelial formation in the middle ear in addition to the one already reported in these Archives vol. xx. In one there was a serious complication of mastoid disease which necessitated an opening of the bone. Swan M. Burnett.

30. Of the fifteen cases detailed by **Adams** twelve were operated upon and three were treated with the Leiter coil. The

indications for operation are pain and tenderness over the mastoid not due to inflammation of the external auditory canal. The operation was always performed behind the auricle and never through the auditory canal. The mallet and chisel were used for making or enlarging the opening. Fourteen cases recovered and one died. The discharge ceased in all but two after the fourth day, and in these two after the sixth day.

SWAN M. BURNETT.

31. On account of five cases, in which the extraction of the carious malleus cured the otorrhœa as well as other severe subjective symptoms and also improved the hearing, DE ROSSI gives a brief historical summary and discusses the indications of the operation. He reminds of the fact that, at the clinic of Rome, the disarticulation of the incus from the stapes and the luxation of the latter have been performed ever since 1876. For the diagnosis of the mobility of the stapes neither Bing's (entotic hearing through the catheter) nor Schwartze's method (exploratory opening) are sufficient. For the diagnosis of anchylosis between malleus and incus the wellnigh normal position of the malleus within a large perforation appears to be a good criterion; if the malleus is movable, it is much retracted, touching the promontory. Furthermore, DE ROSSI gives the description and illustrations of numerous carious processes of the ossicles, and, finally, he discusses elaborately the different operative procedures, describing and illustrating the instruments used by him. GRADENIGO.

32. At the clinic at Halle sixty-nine cases were operated according to Stacke's method, which, however, had to be modified. The cutaneous incision was not extended so far forward, in order to avoid the formation of sequestra and a lower position of the auricle. "The further progress of the operation has been changed, inasmuch as, after eleven openings of the attic for the cure of chronic suppuration with but two temporary recoveries, at first, as a rule, we now make the typical opening of the antrum according to Schwartze, as has also been advised by Stacke, whence we proceed further. It is but rarely possible to ascertain the condition of the antrum by probing, and to delineate the further operation accordingly." The cutaneous wall of the external meatus is not pulled out, but the posterior wall is bluntly detached, and by a long, rectangular blunt hook pushed against the anterior wall. In some cases the meatus, when operated upon according to Stacke's proposition, sloughed. Removal of the

posterior wall of the meatus produced temporary paralysis of the facial in five cases. The instrument for the protection of the stapes was not used. In some cases PANSE has formed the cutaneous flap of the external meatus differently from Stacke, in order to avoid the implantation of the flap upon the freshly opened spongiosa, forming a flap by two parallel incisions posteriorly above and posteriorly below, the subperiosteal connective tissue of the quadrangular flap being stitched to the same tissue of the external soft parts. The after-treatment is then made only through the funnel. "The advantage consists in the tendency of the epidermis to more rapid extension on account of the healthy and well-nourished foundation and the sparing of the artery running along the cutaneous posterior wall of the meatus, and the patient may remain without dressing from the eighth day, when the wound is firmly closed." For after-treatment irrigations or powdered iodoform were used. Plugging should be carefully done. Among fifty-seven radical operations there occurred thirty-one recoveries. The paper is concluded by the histories of the cases. RUMLER.

33. Relapses of suppurations in extensively opened cholesteatomatous and carefully irrigated cavities are due to irritation from putrified products of maceration. Establishment of free aërial ventilation by removal of the entire anterior and lateral wall of the cholesteatomatous cavity and permanent exposure of these defects are the best means of preventing lasting soakage of their walls and of producing resistant epidermisation. SIEBENMANN achieved this result by chiselling off the posterior wall of the meatus according to Zaufal-Stacke, by making the retro-auricular osseous opening as large as possible, and by lining the latter with cutis by means of a postero-superior flap (Schwartze), of transplantation of Stacke's flap from the external meatus, and of carefully stitching the wound of the auricle. Further defects in small cavities with thick corticalis are covered with Thiersch's transplantations when the granulations appear. The healing takes on an average of from one to one and a half months. The full description of the method of operations and of the after-treatment should be read in the original. SIEBENMANN.

34. GRUNERT argues against Siebenmann first defining the views prevalent at the clinic of Halle on cholesteatoma, which he considers as a secondary complication of chronic otorrhœa. The intertrigo-like irritation of the epidermoid investment of the

cholesteatomatous cavity has also been observed at Halle. The relapse, however, is not caused thereby, since the cholesteatomatous pearls become purulent from the centre without a trace of pus in the peripheric layers and upon the walls of the cholesteatomatous cavity. Eczema of the wall develops secondarily from the retained disintegrated secretions. According to the experience of the clinic at Halle in approximately 200 operated cases of cholesteatoma, the complication with caries is much more frequent as is stated by SIEBENMANN. The favorable influence of the access of air has also been observed, but it by no means prevents relapses, since the lining of the cavity presents chronic desquamative inflammation, continuously leading to the shedding of epidermis in lamellæ and its purulent disintegration. Grunert then claims for Schwartze the priority of the idea of permanent exposure of cholesteamatous cavities. The method of operation is then fully discussed, without necessarily requiring careful sewing of the border of the auricle; transplantations according to Thiersch are superfluous, since the cavity exhibits a marked tendency to epidermisation. The cholesteatomatous cavity becomes not infrequently dry in six weeks also at Halle, but without complete recovery, a return of typical cholesteatoma after months and years not being excluded. RUMLER.

35. This is a case of chronic purulent otitis media, with formation of cholesteatomatous masses, after previous unsuccessful removal of the ossicles and subsequent opening of the mastoid process. The combination of the above mentioned symptoms and the appearance of meningitic symptoms led to the operation according to Küster (?), which is very carefully described by the author, consisting in opening of the mastoid process with removal of the posterior and upper wall of the external auditory meatus. The alarming phenomena disappeared and the success of the operation cannot be doubted. The use of electric illumination is recommended in such operations. BOK.

36. Twenty days after the appearance of suppuration of the left ear, signs of depression and ptosis of the right eye appear, meningitic symptoms then arise (enlargement of the pupils, spontaneous vomiting, rigidity of the nape of the neck), with paralysis of the left facial. On account of diagnosis of cerebral abscess, MARCHAND opens the mastoid antrum without result; he then trephines the skull, in the supposition of an abscess in the middle cerebral fossa, and punctures without finding pus. The patient

dies. The post-mortem reveals: (1), the petrous bone and the dura mater to be entirely intact; (2), meningitis acuta suppurativa diffusa, with foci of pus at the different parts of both hemispheres; (3), complete absence of visceral lesions. The author arrives at the conclusion that, in this case, the otitis was the point of issue of a general inflection to which the meningitis was secondary. This case forms an addition to those of Moos, Netter, Zaufal, Chauvel, and Réclus. GELLÉ.

37. Collation of original and reviewed statements on pyæmia, in acute affections of the middle ear and petrous bone, published in the *Archiv für Ohrenheilkunde*, results, according to EULENSTEIN, in the fact that sinus-thromboses are frequently (eleven times among twenty-four cases) missing, that chills occur mostly in the appearance of metastases, that metastases develop principally in the joints (ten times) and in the lungs and pleuræ (eight times), and that one half of the cases of pyæmia die, whilst the other half recover. In a case observed by Eulenstein, the acute suppuration of the tympanic cavity did not affect the antrum, but advanced directly toward the sinus, which bled during the operation. Metastases in the right sterno-clavicular and in the joints of the foot were treated with drainage. The result was favorable after six weeks. The diseased joints and the ear healed. The foot regained its full use, and the hearing power became normal.

KILLIAN.

38. The patient, a female, aged twenty-five, exhibited bilateral otorrhœa for five years, due to scarlatina. The left mastoid process, on account of acute inflammation, had been opened, September, 1892, and a large cavity, filled with fetid pus, was laid open toward the lateral sinus. Since the fever and other general symptoms did not abate, and paralysis of the n. oculomotorius, n. trochlearis, and neuralgia of the fifth, the middle cerebral fossa was opened, and the greatest part of the petrous bone up to its apex was removed subdurally piecemeal. The removed bone was found to be unaltered, but the sinus petrosus inferior, which was thus exposed, contained fetid pus. After the operation, headache and fever immediately disappeared, and the function of the oculomotory and trochlear nerves returned inasmuch as the movements of the eyeball were reduced to one half of the normal excursions. The facial, destroyed by operation, remained paralyzed. SIEBENMANN.

39. URBAN PRITCHARD and LENTHAL CHEATLE give a care-

ful description of opening of the lateral sinus and the jugular vein in a case of pyæmic thrombosis due to otitis (see paper, this volume, p. 24).

40. The patient, a smith, aged twenty-eight, was admitted on account of pulmonary tuberculosis into the patients' ward of the institution for infectious diseases. After continuous rise of temperature up to 39° and more, discharge from the right ear appears. A few days later the patient complains of intense headache, whereupon loss of consciousness, deliria, high temperature, and accelerated pulse suddenly set in. On the following day the sensorium was free, but the temperature rose every evening, the lungs presented general small crepitant râles, the strength was gradually sinking, and, twenty-six days subsequently to the sudden onset of loss of consciousness, death ensued. At the autopsy, the upper lobes exhibited old tubercular lesions, the other parts of the lungs, the spleen, liver, and kidneys, densely crowded with miliary tubercles. In the intestines there was found an old ring-shaped tubercular ulcer near the ileo-cæcal region. In the walls of the pulmonary veins and in the thoracic duct, no tubercular changes were found. In the cerebral cavity, the right lateral sinus contained a thrombus, consisting of yellow, brittle masses. It extended into the jugular vein, and adhered to the wall of the sinus. In the centre of the sigmoid fossa, the wall of the sinus was situated directly over a carious region in the adjoining portion of the petrous bone, communicating with the tympanic cavity. The latter was filled with offensive pus, and the membrana tympani was perforated. In the suppuration of the middle ear, tubercle bacilli and also streptococci and bacillus pyocyaneus were found. *The thrombus contained tubercle bacilli in enormous quantities* apart from the bacteria found in the suppuration of the tympanic cavity. In this case, tubercular caries of the middle ear had probably existed for a long time in addition to the tuberculous affection of the lung. The caries had gradually implicated parts of the petrous bone adjoining the lateral sinus, and the tubercle bacilli, after invasion and destruction of the bone, had caused tubercular affection of the wall of the sinus and finally thrombosis. In the thrombus itself they had apparently found a favorable nutrient soil, and from loosened particles they were thrown into the circulation. It is remarkable that pyæmia, which is otherwise the usual consequence of septic thrombosis of the sinus, did not develop, inasmuch as the thrombus contains

an abundance of pyogenic bacteria in addition to the tubercle bacilli. (AUTOREVIEW.)

41. LANZ, at the surgical clinic at Berne, had, during the last two years, the opportunity of observing three cases of deep-seated cerebral abscesses, two of which followed suppurations of the middle ear. The last of these cases is well illustrated by an elaborate history with very instructive epicritical remarks. It concerned a man, aged twenty-three, who had since the fifth year of age, suffered (after scarlatina) from chronic otorrhœa, and was suddenly seized with chills, headaches, and earaches. Dulness of sensorium, choked disk, and retardation of pulse were later additions. Prof. Kocher opened the antrum by chiselling, but found little pus and the sinus normal; after opening, however, of the middle cerebral fossa up to the region of the upper temporal convolutions, the dura was there found to be slightly discolored at a circumscribed place. Paracentesis of the cerebrum at this place, with subsequent blunt enlargement of the exploratory canal, discharged, from the depth of from 1 to 2 *cm*, fetid pus to the amount of at least 100 *ccm*. During the following days the sensorium became more free and the temperature normal; but subcortical verbal alexia appeared, characterized by the loss of the faculty of reading and writing, whilst the faculty of copying was preserved and the speech of sounds completely intact. Five or six weeks after the operation fever suddenly reappeared and the patient died on the following day under dyspnoëtic symptoms. At the autopsy there was found near the scar resulting from the opening of the cerebral abscess, another encapsuled superficial abscess of the size of a pigeon's egg.

SIEBENMANN.

42. A soldier presents himself with complaints of tinnitus and pain in the right ear. "The membrana tympani appeared dull and somewhat bulging in the posterio-inferior portion; the hearing power was somewhat decreased."

On account of the apparent mildness of the affection the man was treated as an out-door patient. In the evening fever set in, toward the following morning loss of consciousness, restlessness, grinding of teeth, and vomiting. Treatment: Ice-bag upon the head, deep longitudinal incision, according to Wilde, into the right mastoid process, and calomel internally. Death the same afternoon, thirty-two hours after the first presentation. After opening of the skull a fresh, purulent meningitis was found.

"Thickening and dulness of the dura mater around the right porus acusticus internus were noteworthy. The tympanic cavity and labyrinth were completely filled with pus, the membrana tympani was dull and markedly thickened. The purulent contents were visibly thickened, comparatively devoid of fresh cells; they contained, however, many cholestearine crystals and flattened cellular structures, somewhat similar to 'pearl-nodules.' The mastoid cells were found to be intact." Bacteriological examination of the pus revealed the presence of staphylococcus pyogenes aureus, and staphylococcus pyogenes citreus, but absence of Fraenkel's capsule bacillus.

RUMLER.

### NERVOUS APPARATUS.

43. GRADENIGO, G. Aural phenomena in hysteria. *Arch. Ital. di Otol.*, etc., vol. i., pp. 166 and 256.

44. GRADENIGO, G. A case of probable inflammation of the acoustic nerve after influenza. *Allgem. Wien. med. Zeit.*, No. 4 and 5, 1893.

45. BABER, CRESWELL. Auditory nerve deafness. *Brit. Med. Journ.*, Feb. 25, 1893.

46. TOOTH, HOWARD. Absolute deafness associated with diphtheritic paralysis. *Ibid.*, March 11, 1893.

47. LEVA, I. Contribution to the localization of aphasia. (From the medical clinic of Prof. Dr. Eichhorst of Zurich.) *Virchow's Arch.*, vol. cxxxii., No. 2.

43. Of GRADENIGO's paper but that part has heretofore been published which refers generally to the hysterical phenomena of the ear and to acoustic anæsthesia as partial phenomenon of general hemianæsthesia. Gradenigo mentions that the latest publications on hysteria hardly allude to the phenomena arising from the ear, and that but a few text-books of otology contain a brief chapter on hysterical deafness. He attempts to demonstrate that aural phenomena are of comparatively frequent occurrence in hysteria, and that their exact knowledge not only enables the aurist to define precisely the prognosis and treatment of a large number of cases of deafness, but also gives the neurologist a new diagnostic sign through the result of aural examination.

GRADENIGO.

44. The diagnosis depends upon the result of the functional examination. The perception of the high notes ($c^4c^5$) is well

preserved, whilst there exists a defect of the middle notes, principally c$^1$. The functional exhaustion develops rapidly and excessively, so as to render the acuteness of hearing in the tired ear considerably smaller than in the untired one. Electrical irritability is also excessively increased. POLLAK.

45. CRESWELL BABER reports a case of nervous deafness in which treatment with pilocarpine seemed to have rendered good service. The nervous deafness was associated with otitis media.

46. In the case reported by TOOTH complete deafness occurred a month after admission to the hospital when the diphtheritic inflammation had entirely disappeared. The deafness vanished with the cessation of the paralytic symptoms. Tooth deems the diagnosis of a central affection to be more probable than that of an affection of the acoustic nerve.

47. LEVA, analyzing the cases observed during the last ten years at Eichhorst's clinic, furnishes a very valuable contribution to this important subject. His instructive paper follows the synopsis given by Naunyn in 1887 on the localization of the aphasic disturbances, in which, by simple tabulating, the cortical fields are designated for the different forms of aphasia. Naunyn positively succeeded in defining them for motor aphasia, probably for aphasia with word deafness, and doubtfully for the third form—Naunyn's undefined aphasia. Leva looks for the cause of this incompleteness in the paucity of useful cases. Leva has several such cases at his disposal, which may be used for entering into Naunyn's synopsis. In the first case there existed total aphasia with marked sensory aphasia, strictly localized pathological lesion in the middle portion of the upper temporal convolution, 2 *mm* wide, extending to the upper margin of the middle temporal convolution. In the second case, the above-mentioned places were intact, whilst the immediately adjoining, the lower margin of the middle and the entire lower temporal convolution, were occupied by a circumscribed lesion with a trace of aphasic disturbance. Whilst the first case illustrates the strictly localized sensory aphasia, the second case furnishes a natural counter-experiment, which proves exactly that cerebral portions closely adjoining to the cortical fields of aphasia may be affected without producing aphasic disturbances. In the third case there existed purely motory aphasia with typical localization in the lower frontal convolution. In the fourth case a purely sensory aphasia was again associated with a typical lesion in the first temporal

convolution, but in addition the lowest portion of the third frontal convolution was implicated without signs of motor aphasia. Furthermore Leva reports three homogeneous cases of marked aphasic disturbances without microscopically visible lesions in the supposed centres; but in all these three cases lesions were found in the left lenticular nucleus, which extended at different distances toward the cerebral cortex and the island without reaching them. The author explains this by circulatory disturbances in these centres. Effects from the distance existed indeed in two of these cases with serous swelling of the cortex toward the fossa Sylvii on the frontal and the temporal cerebrum respectively. If in these three cases death had not occurred within from one to three weeks, the aphasic disturbances had, according to the author, gradually ceased. If, therefore, aphasic disturbances exist but for a brief period or cease completely within a short time, we should be quite reserved as to the diagnosis of localization. Former observations in this direction are not quite unobjectionable. Moos.

### NOSE AND NASO-PHARYNX.

48. Rangé, Paul. Macroscopical anatomy of Jacobson's organ. *Soc. de Laryng.*, May, 1893.

49. Veasey, C. A. Experiments with cocaine phenate as a local anæsthetic. *Med. News*, April 1, 1893.

50. Freudenthal, W. Asepsis or antisepsis in nasal surgery. *N. Y. Med. Journ.*, February 11, 1893.

51. Rice, Clarence C. The value of sprays in the treatment of catarrhal affections of the upper air passages. *N. Y. Med. Journ.*, January 21, 1893.

52. Wright, Jonathan. Nasal douches and sprays. *Med. Record*, January 14, 1893.

53. Suchannek, Zurich. Further communications on acute rhinitis. *Monatschr. f. Ohrenheilk.*, No. 4, 1893.

54. Abbott, A. C. The etiology of membranous rhinitis (rhinitis fibrinosa). *Med. News*, May 13, 1893.

55. Escherich, Graz. Topical treatment of pharyngeal diphtheria. *Wien. klin. Wochenschr.*, No. 7, etc., 1893.

56. Suchannek, Zurich. Ulcus septi narium simplex perforans and perichondritis septi acuta. *Correspondenzbl. f. Schweiz. Aerzte*, p. 302, 1893.

57. Prof. CHIARI. A case of tubercular tumor of the nasal septum in an infant, with apparently sound lungs and probably primary nasal infection. *Revue de laryng.*, etc., No. 14, 1893.

58. DIONISIO. Contribution to the clinical study of nasal tuberculosis. *Giornale della R. Acad. di Medic. di Torino*, January, 1893.

59. RETHI, Vienna. A case of tuberculosis of the oral cavity with perforation into the nasal and maxillary cavities. *Wien. med. Presse*, No. 19, 1893.

60. COZZOLINO, Naples. A case of sarcoma of the nasal septum with polimorphous cells. *Archivio Ital. a'Otol.*, etc., vol. i., p. 156 u. 233.

61. DANTAL, MICHEL. Tumors of the nasal septum. *Annal. des malad. de l'oreille*, No. 6, 1893.

62. JACQUEMART. Why do nasal mucous polypi return so frequently after extirpation? How can they be cured without danger of return? *Revue de laryngol.*, etc., No. 3, 1893.

63. BRESGEN, MAXIM. Cephalalgia in affections of the nose and pharynx. *Revue de laryngol.*, etc., No. 2, 1893.

64. GRADENIGO. Vertigo and pseudo-angina pectoris as reflex phenomena of nasal origin. *Giorna della R. Acad. di Med. di Torino*, January, 1893.

65. GRADENIGO, G. Vertigo and pseudo-angina pectoris as reflex phenomena of nasal origin. *Revue intern. de rhinol.*, etc., February, 1893.

66. Prof. A. PICK, Prague. Psychopathological reflex symptoms excited from the nose. *Prager med. Wochenschr.*, No. 16, 1893.

67. KIMBALL, JAMES P. Maggots in the nose. *N. Y. Med. Journ.*, March 11, 1893.

68. MADEUF. Nasal obstruction, its physiological mechanism, etiology, and pathological consequences. *Journ. des mal. de la gorge*, etc.

69. ROE, JOHN O. The correction of deformities of the nose resulting from abscess of the nasal septum. *N. Y. Med. Journ.*, March 25, 1893.

70. Prof. E. DE ROSSI, Rome. Novel instrument for straightening the deviated nasal septum. *Archivio ital. d'otologia*, etc., vol. i., p. 154.

71. DOUGLASS, HENRY B. Some points upon malignant disease of the nose. *Med. Record*, May 13, 1893.

72. BRYAN, J. H. Case of suppurating ethmoiditis. *N. Y. Med. Journ.*, January 28, 1893.

73. BROWN, MORGAN B. Empyema of the maxillary sinus and its relations to diseases of the antrum of Highmore. *Med. Record*, April 1, 1893.

74. BLAIR, LOUIS E. Syphilis of the naso-pharynx, with reports of a case of tertiary syphilis of the sphenoid. *N. Y. Med. Record*, April 15, 1893.

75. ROBERTSON. Treatment of ozæna and recurrent nasal polypi by opening and draining Highmore's antrum. *Lancet*, April 29, 1893.

76. GUÉMENT, M. A case of empyema of Highmore's antrum with opening of the sinus according to Désault's method. *Annal. de la policlinique de Bordeaux*, No. 14, 1893.

77. GELLÉ. Empyema of the maxillary sinus consequent to total plugging of the left nasal fossa. *Arch. intern. laryng.*, No. 3, 1893.

78. CARTAZ. Treatment of abscess of the maxillary sinus. *Revue de laryng.*, etc., No. 11, 1893.

79. MOURE, E. I. A novel method of perforating Highmore's antrum. *Ibid.*, No. 2, 1893.

80. Prof. E. ZAUFAL. Manual extraction of an unusually large fibrous naso-pharyngeal polypus. *Prag. med. Wochenschr.*, No. 11, 1893.

81. DE BLOIS, THOMAS ARMORY. The after-results of nasal cauterizations. *N. Y. Med. Journ.*, June 28, 1893; and *Amer. Laryng. Assoc.*, N. Y., May, 1893.

82. WYETH, JOHN A. Advancement of a portion of the superior maxillary bone in cases of hare-lip with anterior cleft of the hard palate, for correcting the deformity of the ala nasi. *Med. Record*, June 24, 1893.

83. SOLIS COHEN, SOLOMON. Notes on acute tonsillitis. *Med. News*, April 29, 1893.

84. KOHN, S. Acute infectious phlegmon of the pharynx following follicular tonsillitis—death in seventy-two hours. *Med. Record*, March 4, 11, 18, 1893.

85. BULKLEY, E. DUNCAN. Clinical notes on chancre of the tonsil, with analysis of fifteen cases. *Med. Record*, May 27, 1893.

86. SENDZAK, JEAN. Remarks on the use of the galvanocautery snare in hypertrophy of the tonsils. *Revue de laryng.*, etc., No. 4, 1893.

87. MACKENZIE, G. HUNTER. Two hundred and fifty cases of tonsillotomy. *Brit. Med. Journ.*, March 25, 1893.

48. RANGÉ has examined Jacobson's organ in oxen and sheep, in which it may be readily investigated. The paper was illustrated by drawings and specimens. GELLÉ.

49. VEASEY from his experiments and cases believes to be justified in reaching the following conclusions :

1. Cocaine phenate can be used in cases of idiosyncrasy to cocaine hydrochlorate without producing systemic effects.
2. In order to produce the same degree of anæsthesia as with cocaine hydrochlorate, stronger solutions of the phenate are required.
3. But the anæsthesia produced by the phenate lasts fully as long.
4. The phenate is preferred in some cases on account of its antiseptic properties. M. TOEPLITZ.

50. FREUDENTHAL considers strict antisepsis to be impossible before and after operation. He operates with sterilized instruments and aseptic hands. In the after-treatment he discards plugging and dressing. He has returned to the open after-treatment and believes that antiseptics, especially sublimate, destroy the physiological function of the nasal mucous membrane. He avoids after-infection of the wound from any outside source. Irrigations of the nose with lukewarm sterilized water or with Javelle's solution of salt and soda before and spreading of collodium over the protective coagulated blood after the operation is all that is required. M. TOEPLITZ.

51. The various petroleum products such as vaseline, albolene, benzoinol, etc., have crowded out many of the old astringent drugs and justly so. Vegetable and mineral astringents irritate and inflame the nasal mucous membrane. Oily preparations are harmless, protective, and thus sedative agents, furnishing non-irritating vehicles for cocaine, oil of pine needles, menthol, resorcin, etc. ; the blandness of the oil softens the irritation, but long continuation of oily sprays produces dryness of the surfaces and contraction of the erectile tissues, which look much like atrophy. Oily sprays are beneficial in cases with congestion and without extreme obstruction. Watery astringents are beneficial in atrophic rhinitis. Disinfecting sprays are invaluable in atrophy,

ozæna, syphilis, polypi, and suppurations. The most useful method of spraying is that with the up-tip spray into the naso-pharynx, which is much preferable to the douche; mild solutions of astringents are here used with safety and benefit. The solutions for spraying should not be cold nor be propelled with great pressure, fifteen pounds being sufficient for the anterior nares. M. TOEPLITZ.

52. In acute, subacute, and chronic inflammations the glands suffer most and succumb the earliest. They should, therefore, not be destroyed by galvano-cautery, but kept open by constant irrigations with water, or rather with alkaline watery fluids. This should be continued for a long time before operative measures are resorted to. No after-treatment is required in intranasal operations except to control hemorrhage, since the nasal secretions cannot be made aseptic. The intranasal tissues possess considerable power of resistance to the entrance of infectious agents. Watery douches and sprays are contra-indicated in the first stage of acute coryza and in young children. Wright gives also the precautions in using either spray or douche. He prefers for his own use in the office the post-nasal syringe and is greatly opposed to the up-tip spray for the naso-pharynx. Oily sprays are to be used when watery sprays are contra-indicated, viz., in acute inflammations. Oil cannot be used as a vehicle for antiseptics. Wright has, except in cocaine and antiseptics, little faith in the drugs applied for nasal therapeutics.

M. TOEPLITZ.

53. SUCHANNEK has made careful microscopical examinations of ten cases of acute rhinitis, which were connected with pharyngitis and laryngitis crouposa and diphtheritica and he gives their detailed descriptions. He emphasizes these changes in the epithelium upon the surface of the mucous membrane and within the glands. In extreme inflammation, the epithelial cells may be at places completely thrown off. The replacement of the epithelium of the surface takes place from the cellular remnants in the lacunæ and emissary ducts of the glands. Suchannek explains these conditions by very instructive illustrations. We refer for the study of details to the original.

KILLIAN.

54. ABBOTT has examined three cases of rhinitis fibrinosa, of which the membranes of the first two were found to contain numerous colonies of bacillus diphtheriæ, which when inoculated

into guinea-pigs caused the death of the animal in less than forty-eight hours. Cultures made from the membranes of the third case, which was observed in a sister of the patient of the second, were morphologically and biologically identical with those of Loeffler's bacillus, but when inoculated did not cause the death of the animals. The cultures obtained from the second case were also found to be devoid of vitality after thirty days. The difference of virulence may explain the variations of intensity frequently observed also in true diphtheria. Abbott is inclined to designate the micro-organism of fibrinous rhinitis as an attenuated or non-virulent bacillus rather than a bacillus of pseudo-diphtheria. The bacilli derived from gelatine or agar-agar cultures are small, pointed, and well-staining, while those from blood-serum and broth are long with swollen ends and staining irregularly. M. TOEPLITZ.

55. The methods of application used by ESCHERICH are as follows: (1) Syringing of antiseptic fluid (sublimate 1:1000) directly upon the pharyngeal mucous membrane; (2) wiping of the pharyngeal cavity by means of sponges dipped into sublimate solution. POLLAK.

56. SUCHANNEK examined microscopically the margin of a simple perforation of the septum (Voltolini) and found: "metaplasia of the superficial epithelium into pavement epithelium. In the tunica propria, the adenoid tissue, situated immediately below the membrana propria appears horizontally situated with yellow pigment cells. The deeper layer of the tunica propria is cicatricial, the glands are degenerated and atrophic, containing colloid. No giant cells and no tubercle bacilli are present." Furthermore, the author communicates two cases of acute perichondritis of the septum from his practice, both without subsequent depression of the nasal dorsum, one without definite etiology, the other with preceding traumatism. SIEBENMANN.

57. Tubercular tumors of the nose are very rare in children when compared with tubercular ulcers. In CHIARI'S case the cartilaginous septum of the left side exhibited an irregular tumor of the size of a hazel-nut, bleeding readily upon touch. It was removed with the cold snare, the base destroyed by the sharp spoon and galvano-cautery. A remaining ulcer healed in a few weeks. The histological examination revealed giant and epithelioid cells and also partly caseous nodules with tubercle bacilli.

The lungs were and remained sound. This case was one of primary nasal tuberculosis. BOK.

58. In the first case reported by DIONISIO a circumscribed tumor consisted of tubercular tissue, in the second an ulceration with tubercular granulations were located upon the septum. GRADENIGO.

59. The case is interesting on account of the extensive destruction in the oral cavity from which the tuberculous process was propagated into the maxillary sinus. POLLAK.

60. COZZOLINO reports the result of the histological examination of a sarcoma with polimorphous cells upon the nasal septum and discusses the different forms of malignant tumors occurring in the nose. GRADENIGO.

61. In addition to two observations of sarcoma teleangiectaticum of the septum, published by Gouguenheim and Hélary, DANTAL describes in his paper (with drawings) a third case of this rare new-formation. GELLÉ.

62. From nine fully reported histories of cases JACQUEMART deduces the principles according to which nasal polypi should be operated in order to avoid relapses. He, therefore, completely destroys in the most careful manner even the smallest remnants of polypi and the hypertrophied tissue in the adjoining parts partly with the snare, partly with the galvano-cautery. The relapses are only prevented by such extremely careful operations which, if necessary, should be performed at several sittings. BOK.

63. Cephalalgia is a very frequent symptom in nasal and pharyngeal affections. It develops frequently from the nose, if the nasal fossæ, through swelling of the mucous membrane, are naturally narrow or if retention of secretions takes place. In the pharynx, principally tumors (adenoid vegetations, polypi) and local inflammations produce cephalalgia. Affections of the nasal accessory cavities play also an important part. The treatment has to direct its attention to the point of issue, which may be readily ascertained with the probe. The therapeutic procedure depends upon the diagnosis. BOK.

64. GRADENIGO directs the attention to the frequent occurrence of vertiginous phenomena in nasal affections. Four cases are reported, one of which deals with the cure of asthma by the treatment of the nose. GRADENIGO.

65. Among nervous reflex phenomena of nasal origin GRADENIGO mentions the occurrence of vertigo and pseudo-angina as

being very rare. He gives four observations of the first and one of the second class. In every case physiological abnormities were found in the nose, after the removal of which the pathological phenomena disappeared. The symptoms of pseudo-angina pectoris are the same as those of angina pectoris hysterica.

BOK.

66. In an hereditary case of melancholy the hypertrophied turbinated bodies, which had been supposed to be pathogenetic, were removed with the cold snare. In spite of the removal of the primary exciting cause the main condition persisted after improvement of short duration and the compulsory conceptions and impulses reappeared. POLLAK.

67. The affection, comparatively frequent in Texas, is well illustrated by a case in which the larvæ of the *sarcophaga georgina* (Wiedemann) were deposited in the nostril of the sleeping patient, the fly being attracted by the odor of an old ozæna. Injection of pure chloroform only, after many futile trials with other remedies, cured the patient, from whom more than three hundred maggots were ejected. The patient had become delirious, eyes were extremely swollen, and deglutition was so much impeded by swelling as to necessitate feeding with stomach-tube. The maggot fully develops in forty-eight hours. KIMBALL collected seven cases, all of which but one proved fatal. All cases had suffered from previous ulcerative processes of the nose with ozæna. Of all remedies experimented with upon maggots none acted so promptly and thoroughly as chloroform. M. TOEPLITZ.

68. MADEUF discusses the different kinds of nasal obstruction, their etiology, and pathological consequences, viz., coryza chronica, pharyngitis chronica sicca, diseases of the eye (blepharitis, conjunctivitis, etc.), affections of the hearing organ (retraction of the membrana tympani, displacement of the ossicles, disturbances of hearing), furthermore laryngitis stridulosa, deformation of the thorax, disturbances of nutrition. Of especial interest are seven photographs of a patient with adenoid vegetations taken at different ages. BOK.

69. ROE's method is as follows when the soft parts are preserved: "The thickened ridge of tissue of the dorsum is incised through to the under side of the skin on both sides, a short distance from the septum at a point where it thinned into the alæ nasi. The skin is then raised from the dorsum and the flaps turned upward and held in place by small ivory splints, having holes through

which sutures are passed from one to the other through the flaps and tied without strangulating the parts." In extreme cases, in order to increase the solidity of the septum, each side of its lower portion and the floor is scarified and the anterior portion of the septum divided, leaving the front portion of the skin intact. The flaps from the floor are turned upward and held together as above and the upper borders are united by sutures to the cut portion of the septum. The nose is kept in position by spiral springs until healing takes place. The paper is well illustrated by photographs.

M. TOEPLITZ.

70. The instrument used by DE ROSSI for straightening the septum consists, like those of Adam and Jurasz, of two steel blades covered at their inner surface with elastic rubber. The blades are introduced separately and approached by a screw.

GRADENIGO.

71. The object of this paper is the diagnosis of malignant disease of the nose. DOUGLASS distinguishes between local, general, and so-called malignant symptoms. Local symptoms are identical with those produced by a foreign body. General symptoms are hypersecretion, fulness in the head, headaches of different kinds, supra-orbital and quintus neuralgia, deformities by displacement, symptoms from obstruction of the nasal foramina and reflex symptoms. Symptoms of malignancy are infiltration, hemorrhage, ulceration, and pain; the first being also the earliest and a sero-sanguineous, offensive discharge from the nose always being suspicious of malignancy. The *distinctive* clinical features are appearance, deformity, age, deposits, and locality. The color of sarcoma varies from a red or a bluish-red to a gray; the carcinoma has no characteristic coloring. The consistency of sarcoma is hard; carcinoma lacks a well-defined consistency and ulcerates more rapidly. Carcinoma presents early a general cachexia of the patient which is absent in sarcoma. The latter produces deformities by displacement of normal structures, whilst the deformities of carcinoma are produced by ulceration without displacement. Douglass concludes his remarks by pleading for the use of the microscope in diagnosis of nasal diseases only after a matured differential diagnosis made after exhaustive clinical research.

M. TOEPLITZ.

72. BRYAN'S patient, a woman aged twenty-eight, derived her affection from influenza, suffering also at the same time from caries of the upper left second molar tooth. The left nostril became stenosed, secreting thick, fetid masses from the front of

the nose and into the naso-pharynx. There existed severe pain over the nasal bridge, extending over the infra-orbital ridge, also extreme pain upon pressure on the eyeball, and crepitating sensation at inner angle, but no exophthalmus. Two polypi were found attached to the left middle turbinated body. The left antrum was found to be affected, and was opened from the alveola of the affected molar. The redeveloped polypi were removed and withal a small spicula of bone, thus establishing an opening, through which on the following day the ethmoid abscess evacuated spontaneously thick, caseous masses, giving immediate and permanent relief. Bryan prefers for operation the snare and sharp spoon to the drill. M. TOEPLITZ.

73. BROWN dwells fully upon the anatomy of the maxillary sinus and the etiology, symptomatology, and diagnosis of its diseases. For differential diagnosis he lays much stress upon transillumination, believing that its umbræ are rather caused by infiltration and thickening of the mucosa than by the presence of pus. In cases of atrophic rhinitis he has found sub-orbital umbræ without pus, and has given much relief after perforation and irrigation of the sinus. Sounding and irrigation through the natural opening are difficult and did not prove to be satisfactory measures. Injections of peroxide of hydrogen through the semilunar hiatus are also valuable for differential diagnosis. Exploratory puncture from the lower meatus, alveolus, alveolar hypophysis, or canine fossa were also practised. The first method is advocated for diagnostic purposes only, the second is thoroughly condemned, whilst treatment from the natural ostium maxillare, or, better, by perforating the alveolar hypophysis, are highly recommended. Brown performs the last-mentioned operation by casting out a circular piece of mucous membrane with a tubular knife, just below the gingivo-labial fold, between the roots of the second bicuspid and first molar, and drilling upward, inward, and backward into the most dependent part of the sinus. The proximal end of the drainage-tube is fastened by a collar or clasp to a tooth. As a more radical measure, Robertson's method of operating and searching from the canine fossa is approved.

M. TOEPLITZ.

74. BLAIR does not agree with some writers, notably Bosworth, that tertiary syphilis of the naso-pharynx shows but little tendency to take on a destructive or spreading condition. The diagnosis of gumma in the naso-pharynx is strengthened by Pick's brick-red arch along the arcus palatoglossus and the intolerable

stench characteristic of necrosis. He illustrates the disease by a case which occurred in a patient, aged thirty-five, who presented himself with obstruction of both nostrils lasting three weeks, and swelling and pain in the throat, causing great difficulty of deglutition. There existed also tinnitus, lancinating pains in head, headache in vertex, dizziness, staggering gait, temporary unconsciousness, nausea, and great prostration. History of syphilis of twelve years' standing. Perforation of septum and of palate at the junction of soft and hard palates was associated with fetid discharge and characteristic odor. Necrosis of the sphenoid probed through the palatal opening was gradually loosened and removed through the mouth. The sequestrum represented at least one half of the body of the sphenoid, showing the sphenoidal sinus completely on one side. Blair warns against the use of force in removing the sequestrum. M. TOEPLITZ.

75. ROBERTSON believes that diseases of Highmore's antrum, even when producing a few symptoms, cause various disturbances of the nose and ear, which can only be removed by treatment of Highmore's antrum. He recommends to make an opening in the anterior wall of the size of a sixpenny-piece, and keep it open in a suitable manner.

76. Désault's method of opening Highmore's antrum (from the fossa canina) ought, according to GUÉMENT, to be more frequently practised, since it is in some respects preferable to the other methods. From this opening, *e. g.*, more efficacious insufflations into the maxillary sinus can be made than from another. The entrance of the numerous microbes of the oral into the maxillary cavity is rendered difficult. Cowper's method is to be used only if carious teeth constitute the cause of suppuration. An exact observation of a case of suppuration of Highmore's antrum is appended. BOK.

77. In a patient, aged sixty, with epistaxis, posterior plugging had been made in consequence of an alarming hemorrhage. The bleeding ceased. After forty-eight hours the patient categorically refused the removal of the tampon, which on the tenth day was permitted on account of the offensive odor. Antiseptic irrigations were ordered, but chills appeared for two days notwithstanding. Profuse, offensive, muco-purulent discharge persisted for one month. The patient refused to be examined. After his return a year later, muco-purulent discharge still persisted.

GELLÉ.

78. **Cartaz** gives a synopsis of the different methods of treating empyema of Highmore's antrum, discussing them successively. For unsuccessfully treated suppuration of long duration he recommends the opening of the maxillary sinus from the fossa canina and its curettement. Intense hemorrhages resulting therefrom may be readily stopped by plugging. Partition walls in the cavity should be removed. Bok.

79. **Moure** recommends, for ascertaining the suppuration of Highmore's antrum, the perforation of the external nasal wall by means of a galvano-cautery point. This method is to be preferred to that with the pointed troicarts, not requiring particular pressure, which may produce fractures of the nasal frame. After the perforation, antiseptic injections are made by the author. Bok.

80. The tumor, weighing 112 grammes, measuring 11 *cm* in length, 6 *cm* in width, and 3.50 *cm* in thickness, filled the entire lower pharyngeal cavity and could be traced by palpation into nasopharynx and close to the aditus laryngis ; a cylindrical portion 5 *cm* long, reached the left nasal cavity up to about 1½ *cm* behind the nasal entrance. **Zaufal** revolved the tumor by means of the index and middle fingers into the oral cavity. He then embraced the tumor with the index and middle fingers of each hand, then placed also the thumbs upon the anterior surface of the tumor and thus removed the tumor, pulling it off its insertion by gradually increasing force. No hemorrhage. Five days subsequently an intense hemorrhage suddenly appeared through the left nostril, which was stopped by plugging. Both ears were then seized with otitis due to streptococci which terminated in complete recovery after five weeks. Pollak.

81. The different forms of sequelæ of nasal cauterization are divided into those: (*a*) with sufficient, (*b*) with excessive, cauterization ; (*c*) with an intermediate effect between the two former ; and into (*d*) such cases, which are never reached by the cautery. The discussion of the paper brought out the fact, that galvano-cautery is an excellent measure when properly used by skilful and judicious rhinologists. M. Toeplitz.

82. **Wyeth** corrects the flattening of the wing of the nose by advancing the anterior portion of the anterior maxilla of the deficient side. He drills a hole about half an inch from the anterior edge of each maxillary bone through the bone and holds the trimmed edges, brought in contact by advancing the bone of the short side, detached between the two teeth by means of soft wire

inserted into the holes. The loosened bone is nourished from the soft portions, which are not operated upon before eight weeks after the first procedure. The method and result of the operation are illustrated by drawings and photographs. TOEPLITZ.

83. SOLIS COHEN distinguishes between rheumatic and non-rheumatic cases, the former requiring also constitutional, the latter topical treatment only. In rheumatic cases he prescribes a six-ounce solution, containing four fluid drachms of ammoniated tincture of guaiac and ninety grains of sodium salicylate, to be used as a gargle and internally. In folliculous tonsillitis, a ten per cent. solution of cocaine is swabbed over the parts and plugs of sebum, desquamated epithelium and bacteria are removed with the scoop; in severe cases scarification or incision is resorted to. For infiltrations of the neck, heat or a fifty per cent. ichthyol ointment is used. For rheumatic cases he prescribes salol, thirty grains daily, which in cases of carbolic poisoning by salol is to be substituted by salicylate of sodium, oil of gaultheria or cinchonidine salicylates. Anæmic patients receive a mixture of iron chloride with sodium salicylate; convalescents and recurrences cinchonidine salicylate, in the latter preceded by a saline cathartic. In non-rheumatic cases Cohen alternates the guaiac gargle with sprays of peroxide of hydrogen. Tonsillitis from influenza is treated with cinchonidin salicylate and sodium benzoate internally, and peroxide of hydrogen and injections of ichthyol topically.

M. TOEPLITZ.

84. KOHN reports a case of follicular tonsillitis with dysphagia and difficulty in speaking, in a man, aged forty-five, which was not relieved after expressing the cheesy masses. This was followed by hard swelling of the submental connective tissue, extending to the left side, without marked glandular swelling, but with infiltration of the connective tissue of the subparotid and submaxillary region. The tongue was swollen to twice its natural size. Temperature 101½° F., pulse 108 and good. The patient was dead on the following morning. Kohn considers this case as an exact analogon to that described by Senator in the *Berl. klin. Wochenschr.*, No. 5, 1888.

Arpad Gerster, in a letter to the editor of the *Medical Record*, takes exception to the diagnosis of the case, which he considers as one of angina Ludwigi, and which he would have treated by incision into the submaxillary gland.

Kohn, in reply to this letter, points out that a follicular tonsillitis, with œdema of the left oro-pharynx and infiltration extending to the parotid without marked glandular swelling, is not indicative of angina Ludwigi, which he understands to be a primary inflammation of the deep-seated submental and submaxillary connective tissue. M. TOEPLITZ.

85. BULKLEY found among 2000 cases of syphilis, 110 instances of extra-genital chancres, of which 15 chancres of the tonsil come next in frequency to 49 chancres of the lip. The sexes of the patients with chancre of the tonsil were almost evenly divided, there being eight males and seven females; the ages ranged from eleven to forty-eight years. The right tonsil was affected alone in nine cases, the left alone in three cases, and both together in three cases. Bulkley illustrates the disease by two typical cases, giving as the most important diagnostic feature the hardness of the tonsil, which is to be made out by palpation and also submaxillary and post-cervical adenopathy of the affected side. Syphilis arising from tonsillar chancre generally runs a very severe course. The modes of infection consisted in three cases in vile, bestial practice with their own sex, in ten other cases from kissing or a drinking cup, whilst in two instances no probable hypothesis could be made. TOEPLITZ.

86. SENDZAK recommends for removal of hypertrophic tonsils the use of the galvano-cautery snare. This method is preferable to tonsillotomy, since hemorrhages are thus wellnigh completely avoided. Cocaine produces perfect anæsthesia. Narcosis is unnecessary. In very small or unmanageable children tonsillotomy is to be preferred. BOK.

87. HUNTER MACKENZIE reports 250 tonsillotomies. In most cases a ten per cent. solution of cocaine was used, the hemorrhage never alarming; the operation was always done with good success, in two cases only the tonsils returned. In aural affection tonsillotomy was insufficient, and treatment of the naso-pharyngeal cavity had to be added.

# SECOND MEETING OF THE GERMAN OTOLOGICAL SOCIETY.

At Frankfort-o.-M., on May 20 and 21, 1893.

Reported by Dr. E. BLOCH, Freiburg-i.-Br.
Translated by Dr. MAX TOEPLITZ, New York.

The meetings were held at Leuckenberg's Institute.

First Meeting Saturday, May 20th, from 9.30 A.M. until 1.30 P.M.

1. DERKER, Hagen-i.-W., demonstrates specimens and communicated contributions to the *Anatomy and physiology of the middle ear and labyrinth of some mammals*, especially of the horse. Manometer experiments yielded analogous results with those found in man by Politzer and Bezold.

Discussion : Kuhn, Bezold, Lucae.

2. VOHSEN, Frankfort-o.-M., demonstrated *Corrosion specimens of the human ear*, made according to Siebenmann's perfected method.

Discussion : Siebenmann, Seligmann.

3. SIEBENMANN, Bâle, briefly reports his new examination of the *vascularization of the cochlea and vestibule* and explains them by illustrations and specimens. Three arteries and three veins supply the inner ear ; in both scalæ, there exist arteries *and* veins, but the principal veins are situated in the tympanal, arteries in the vestibular scala.

4. LEMCKE, Rostock, treats of the question, whether *osteosclerosis* was to be considered as protective arrangement for the ear, and answers it in the negative. The reported cases make it rather appear as a dangerous complication of chronic suppurative processes. Extradural abscesses, cholesteatomata, labyrinthine necrosis are more frequently associated with osteosclerosis of the temporal bone.

Discussion : Oscar Wolff, Bezold, Seligmann, Hartmann, Lucae.

5. A. HARTMANN, Berlin, demonstrated two specimens with *thickening of the external meatus*, principally of the spinæ of the tympanic ring. The author did not observe that these small tubercles increase markedly in the course of time. He explains their development embryologically.

Moos communicated similar conditions many years ago.

Discussion : Lucae, Koerner, Moos, Kuhn, Hartmann, Kretschmann, Bezold.

6. BEZOLD, Munich, *Extraction of the stapes.* Caused by the American reports, the author performed this operation in a case of large defect of the right membrana tympani with adhesion of the handle of the malleus to the promontory : Whisper, A.D., ⅛ inch ; A.S., 4 inch. Loud convers. : A.D., 4 inch ; l. ⅛ inch ; Tuning-fork : A.D. = C only, A.S. up to A. ; G. 1. 7, or A.S. 2.3 turns respectively ; Rinné A.D.—7″, A.S.—15″ (for a′). A (Schwabsch) A. D., prolonged ; A. S., shortened. In extraction, periosteum, cartilaginous covering of the plate, and annular ligament were left in the ear. Hearing power *after* operation : Whisper, A.D. = 0, after three weeks ; other ear, lower limit A, G. A. D. 2.3. After initial absolute deafness (c″ and f major″ only were perceived through the air), improvement took place, but not to the status quo ante.

Discussion : Lemcke, Ludw., Wolff.

7. KOERNER, Frankfort-o.-M., demonstrated a *sequestrum* from a mastoid process operated three years previously.

8. KUHN, Strasburg-i.-E., reports some cases and demonstrates specimens of sinus phlebitis and of *carcinoma of the middle ear.*

Discussion : Jansen.

9. v. Wild, Frankfort-o.-M., reports a case of pyæmia in acute affection of the *mastoid process.* In percussion with his and Koerner's hammer, dulness was found over the diseased bone.

Discussion : Eulenstein.

10. EULENSTEIN also discusses *pyæmic mestatases* in acute affections of the *temporal* bone, narrating the full history of such a case and its various clinical symptoms.

Discussion : Kuhn, Koerner, Szenes.

11. **Jansen**, Berlin, communicates some interesting and rare *complications* from the *mastoid process.*

Second meeting, Saturday, May 20th, at from 3.30 P.M. until 5.30 P.M.

12. **Koerner**, Frankfort-o.-M., discusses the *intracranial complications of caries of the petrous bone*, especially *during childhood*, meningitis and cerebral abscess. These take in children a somewhat different course from that in adults. In the former the meningitic irritation symptoms are prevalent, less severely, however, than other symptoms. In addition, other affections, especially tuberculous cerebral affection, frequently render the diagnosis difficult. Brief report of three cases of this character.

13. **Kretschmann**, Magdeburg, furnishes a contribution to the study of *optic cerebral* abscess. A case of abscess in the temporal lobe after acute suppuration of the ear was not recognized *before* the autopsy. The second case was diagnosed in time and operated. The author emphasizes the fact that abscesses ought, if possible, be looked for from the petrous bone, the tegmen tympani, or the roof of the antrum. The abscess is then found at its lowest place and favorable surgical conditions are established for the healing.

Discussion : Vohsen, Lucae, Koerner, Kretschmann, Kessel, Jansen, Eulenstein.

14. Moos, Heidelberg, reports the course of a *mastoiditis*, as it has heretofore not been described with burrowing abscess and infiltration in the nape of the neck on either side of the vertebral column. Simultaneously, there exists a reflux of the pus through the fissura squamo-mastoidea into the middle ear and the external meatus. Repeated enormous discharges of pus emptied with the assistance of massage ; vertigo, and subjective noise disappeared together with the abscess.

Discussion : Kessel, Moos.

15. L. **Wolff**, Frankfort-o.-M., reports the simultaneous occurrence of severe *inflammations of the middle ear in three children of one family.* Three of the four children of that family affected with catarrh of the upper ear passages, were seized with decrease of hearing from acute otitis media. Neither originated in an acute exanthematous affection nor in pneumonia, but principally staphylococcus pyogenes aureus were demonstrated.

Discussion : Moos.

16. L. Wolff. Presentation of a case of congenital *atresia of both external meatus* without deformity of the auricles. The latter is a well-known concomitant of atresia.

Discussion : Hartmann, Moos, Kessel.

17. Vohsen, Frankfort-o.-M., demonstrated *two cured cases, operated according to Stacke*, with *persistent* opening behind the auricle.

In the third meeting, held immediately after the second for the transaction of the business of the Society, the city of Bonn was elected as place for the next meeting during Pentecost, and the by-laws of the Society were revised. The annual fee of $2.50 remains unaltered.

Fourth meeting, held on Pentecost Sunday from 9 A.M. until 12.30 P. M.

18. Siebenmann, Bâle, demonstrated *injected specimens* of the ear.

19. Seligmann, Frankfort-o.-M., presented a patient with *bleeding from the jugular vein* during *paracentesis* of the membrana tympani.

20. Bezold, Munich, demonstrated specimens of *sclerosis* and of *atrophy of the cochlear nerve.*

21. Bresgen, Frankfort-o.-M., demonstrated a set of *aural specula* made of aluminium and modified by him.

22. Bezold, Munich : *Anchylosis of the stapes and nervous deafness.* Bezold gives another post-mortem examination for establishment of the diagnosis in these cases with extreme deafness, negative Rinné, prolonged bone-conduction, absence, as there invariably is in sclerosis, of the lower end of the tone scale (for aërial conduction), and also of the uppermost tones. Death from carcinoma. Stapes entirely immovable, partly with osseous adhesions. Atrophy in the first cochlear turn. In another in case, patient, aged thirty, typhoid fever, who, the left ear, had perceived only from D to a′, atrophy in the left cochlea was found.

Discussion : Lucae, Kessel, Hartmann, Bezold.

23. Bezold : Remarks on the continuous series of tones. Bezold uses tuning-forks down to sixteen vibrations, the whistle for high tones, and Galton's whistle for the highest notes.

24. Lucae, Berlin : New critical experimental examinations of the diagnostic value of examinations for tones by means of tun-

ing forks. Speech is a much more reliable means of examination than the tuning-fork. Defects at upper limit of the gamut (nervous affection) are alone of importance. The paper cannot suitably be criticised in a brief review.

Discussion is declined according to a vote taken, in order to give the remaining papers an opportunity to be read.

25. Moos makes some remarks upon the *low tuning-forks of Appun*, which have been mentioned in the preceding number of these Archives.

26. HAUG, Munich: The *ear and erysipelas*. The latter may affect the external or middle ear, more frequently the former, either primarily or secondarily. The histories illustrative of the author's view, had, as we regret to state, to be omitted on account of lack of time.

27. JANSEN discusses the *opening of the accessory cavities of the nose*. The malar cavity should be widely opened from without, plugged with iodoformed gauze for a few days, and then closed with an obturator. The lower wall of the frontal sinus only should be removed after a curved incision below the eyebrows, without interfering with the anatomical orificial duct.

Discussion: Bloch.

28. JANSEN briefly discusses the *different methods of mastoid operations*. He prefers Zaufal's method, but recommends Stacke's plastics in order to obtain a permanent opening. To prevent the rapid return of cholesteatomatous masses, all osseous niches within reach should be carefully exposed.

Discussion: Stacke, Kretschmann, Hartmann.

29. H. SZENES, Budapest, communicated a case of objective *aural noise*, which was not synchronous with the pulsation and independent from the respiration, but depended upon muscular contraction.

30. KRZYWICKI, Koenigsberg, demonstrated specimens.

31. LUCAE, Berlin: *Massage of the nasal mucous membrane*. He believed that the excellent effect, according to his own subjective experience, in fact, depended upon massage. Catheterization is a kind of massage. He devised a catheter-like, solid instrument, in order to perform slowly sliding movements in the nose.

Discussion: Vohsen.

32. **Hartmann**, Berlin, demonstrated various *instruments for the ear and for the nose* and its accessory cavities.

33. **Avellis**, Frankfort-o.-M., also demonstrated instruments.

34. **Flatau** (Berlin) did the same.

35. **Seligmann**, Frankfort-o.-M., explains his apparatus for vibratory massage, worked by electric current.

The order of the day was thus exhausted. The meeting was a great success.

# BRITISH NOTES.

## SOCIETIES.

**Midland Medical Society.**—At a meeting held on April 5, 1893, Mr. Chevasse read a paper on "Lateral Pharyngotomy as a Method of Treating Malignant Disease of the Tonsil," and the paper was published in extenso in the *Lancet* of June 10th. One incision was made from the lobule of the ear to the cornu of the hyoid bone, and another from the latter point to the angle of the mouth, dividing the cheek. The tonsil was removed through the V-shaped opening thus formed, all the soft parts being first divided. At the end of the paper the reader will find an interesting résumé of the history of the lateral operation.

**Royal Academy of Medicine in Ireland.**—At a meeting of the surgical section held on May 12th, Dr. C. B. Ball read notes of a case of abscess in the temporo-sphenoidal lobe in a girl of seventeen who had had otorrhœa for nine months, and upon whom he had operated. The abscess was reached through a trephine opening made directly above the external meatus, and so placed that the lower margin was half an inch above the roof of the meatus; over an ounce of pus escaped on the day of the operation. The patient made a perfect recovery.

**British Medical Association—Border Counties Branch.**—At the meeting held at Keswick on May 12th, Dr. MacLaren of Carlisle read notes of two cases in which he had trephined for temporo-sphenoidal abscess, following suppurative middle-ear disease.

**South Midland Branch.**—At the meeting held at Northampton on June 8th, Mr. W. G. Nash, of Bedford, read notes of a case of chronic otitis media; septicæmia; exploration of the mastoid antrum and lateral sinus; recovery.

SHROPSHIRE AND MID-WALES BRANCH.—At the meeting held at Shrewsbury on June 27th, Mr. T. R. Cæsar showed a case of internal-ear deafness which had benefited by the prolonged use of hypodermic injections of pilocarpin.

INTERCOLONIAL MEDICAL CONGRESS—SYDNEY, 1892.—We have just received the verbatim report of the papers and discussions upon diseases of the nose, throat, and ear at this Congress. The report is made up in the form of a pamphlet of forty-five octavo pages, and contains much interesting matter.

Papers upon post-nasal growths were read by Drs. Barrett and Webster, by W. F. Quaife, M.B., and by Dr. Gibson, and in the discussion which followed Drs. Hamilton, Hozier, Kenny, Nihill, Kenna, and Brady took part. A paper upon "Nasal Disease as a Casual Factor in Affections of Adjacent Parts and Distant Organs" was read by C. H. S. Hozier; one on "Thyrotomy for Papilloma of the Larynx in Young Children," by Dr. Lendon; on "A Form of Senile Otasthenia," by W. F. Quaife, M.B.; on "A Case of Parasitic Disease of the Pharynx," by Dr. Dick; on "Hypertrophy of the Lingual Tonsil," by Dr. Hamilton; and on "A Combined Vapor-Inhaler, Tympanum Inflator, and Nasal and Aural Insufflator," by H. P. Slogett. Apart from the intrinsic merit of the individual papers, which is considerable, our colonial brethren are to be congratulated upon their energy in having collected into one convenient form such a valuable record of their work.

BRITISH LARYNGOLOGICAL AND RHINOLOGICAL ASSOCIATION. —At the meeting held on June 30th, reference was made to the question of malignant disease of the tonsil, which is just now occupying so large a share of attention. Drs. MacIntyre, Grant, and Wolfenden, and Mr. Mayo Collier related cases of this description.

PLYMOUTH MEDICAL SOCIETY.—At the meeting held on October 4th, Mr. Woollcombe showed for Dr. Fox, a woman aged forty, from whom recurring tumors on both auricles had been removed at intervals of twenty-three, sixteen, nine, and six years. They varied in size from that of a walnut, and were considered to be keloid in character.

BRITISH MEDICAL ASSOCIATION.—Annual General Meeting held at Newcastle-on-Tyne, August, 1893. In addition to Mr.

Bendelack Hewetson's address as President, many communications of interest and value were made to the section of otology. The following papers were published in more or less detail in the *British Medical Journal* of September 9, 1893, viz.:

"Treatment of Chronic Suppuration of the Middle Ear by Excision of the Auditory Ossicles," by Dr. W. Milligan. This is a very valuable contribution to the subject, on which Dr. Milligan is undoubtedly a great authority. The main conclusions to which the author arrives are, that the proceeding should be adopted after other local means have been well tried without success, that the main difficulty is in the narrow field of operation, and that occasionally unpleasant after-effects, such as vertigo, facial paralysis, etc., arise.

Mr. G. Metcalfe, M.B., B.S., records five cases in which he administered pilocarpin hypodermically, but was not pleased with the result; he speaks, however, in favor of its local application through a Eustachian tube. In the debate following this paper all the speakers expressed disappointment at the results of the hypodermic injection of this drug.

Dr. Robertson contributes papers on the "Implication of the Ear in Diseases of the Nose and Naso-Pharynx"; "The Influence of Oral Breathing"; "Eustachian Synechiæ."

Dr. Walter Browne, of Belfast, related particulars of a case in which the prong of a fork two inches long had been removed from the mastoid cells after impaction for nineteen years.

Dr. Milligan showed a new form of intra-tympanic syringe arranged upon the principles of the ordinary hydrostatic douche.

"The Symptoms and Treatment of Septic Infection of the Lateral Sinus as Illustrated by Ten Cases" is the title of a paper by W. Arbuthnot Lane, M.S., and a case of this sort was also reported by Mr. Hugh E. Jones, of Wigan.

In addition an instructive discussion upon the surgical treatment of mastoid diseases and its complications was introduced by Prof. William Macewen, the other speakers being Professor Horsley, Mr. Hugh E. Jones, Dr. William Hill, Dr. Robertson, Mr. Rushton Parker, and Dr. Milligan. The chief point about this discussion was the remarkable unanimity with which the necessity for surgical treatment was insisted upon. Dr. Adolph Bronner, of Bradford, also contributed notes of sixty cases of mastoid disease in which the antrum was opened.

## MISCELLANEOUS.

It is with great pleasure that we have to record that the Select Committee of the House of Commons have agreed to recommend the main principle of the bill relating to the education of deaf-mutes.

"Cholesteatoma of the Mastoid Cells" is the title of a short article in the *Lancet* of May 13th, by A. Marmaduke Sheild. After reviewing what is known concerning the history and pathology of this condition, Mr. Sheild relates particulars of an interesting case that had come under his care at Charing Cross Hospital. The patient was a young girl of drowsy, stupid aspect, and complaining chiefly of persistent headache; she was also quite deaf on the affected side, and had facial paralysis. Simply scraping out the caseating debris was followed by only temporary relief, and it was not until the outer shell of the containing cavity had been thoroughly removed with the mallet and gouge that any permanent improvement could be detected. The change in the patient's mental condition after this operation was most marked.

Mr. Richard Lake in the *Lancet* of May 27th draws attention to the possibility of a localized inflammation of the posterior superior quadrant of the tympanic cavity, and points out that the various structures which effect the shutting off of this portion are the tendon of the tensor tympani, the descending process of the incus, the stapes, stapedius, and pyramid, and the chorda tympani. He recommends that after incision the middle ear should be irrigated with a sixth per cent. salt solution passed through the Eustachian tube by means of a catheter.

In the *Lancet* of June 3d Mr. Wherry, of Cambridge, relates how he removed a bluebottle from the external meatus. A curious and interesting point in the narrative is, that with the fly were also washed out a number of small white maggots, although only about a quarter of an hour had elapsed from the time of its insertion. Mr. Wherry accounts for this on the supposition that the bluebottle commonly hatches its eggs in its own body.

In the same issue of the same paper, Dr. Bond gives a detailed account, with engravings, of the case of myxo-chondroma of the larynx removed by him in September, 1892. The patient recovered and was shown at the Clinical Society of London on April 28th.

A case related by Mr. Edward Jessop in the *British Medical Journal* of June 10th is instructive. Mr. Jessop had removed the tonsils from a child by guillotine on April 28th. On May 2d hemorrhage set in, and was checked with some little difficulty. Two days subsequently fresh hemorrhage occurred, and this time in a more severe form, ceasing only on the repeated application of a strong solution of perchloride of iron; the child was apparently in considerable danger. This case illustrates very well the undoubted fact that until the wounded surface has healed we can never be quite safe, and this is the history of many recorded fatal cases.

The length of time that a foreign body may exist in the external meatus, without causing appreciable inconvenience, is well illustrated in the case recorded in the *Lancet* of June 10th, by Mr. Edward J. Pritchard, of Chiswick. There does not appear to be any doubt that in this instance a pea had been thus retained for twenty-one years. In commenting upon this case, Mr. Pritchard advises the use of a fine wire snare in those cases in which "syringing is contra-indicated." We cannot help thinking, however, that such contra-indication but seldom arises, but, on the contrary, that there are but few, if any, foreign bodies which cannot be dislodged by the judicious and skilful use of the syringe, and that in by far the majority of cases it is the use of wire snares, scoops, hooks, etc., which is most strongly contra-indicated.

In the *Lancet* of June 24th, Mr. T. Gann, of British Honduras, relates the case of a creole woman who had died suddenly from the rupture of a tonsillar abscess into the larynx, causing suffocation.

Mr. J. D. Hillis, of Dublin, contributes to the *Medical Press and Circular* of July 5th a short paper upon adenoid growths. Mr. Hillis believes that, except in refractory patients, anæsthesia is not necessary, but he does not state the proportion of refractory to unrefractory patients, nor does he draw the line very distinctly between those cases in which general anæsthesia is rather a matter of convenience than absolute necessity. In operating Mr. Hillis prefers to use some form of ring-knife.

In the treatment of epidermic masses plugging the external auditory meatus, Surgeon W. Eames, R.N. (*British Medical Journal*, July 8th), advocates frequent instillations of a ten %

solution of Barff's boro-glyceride, and repeated gentle syringing until the masses are removed.

In the *British Medical Journal* of July 22d Mr. Lennox Moore figures and describes a modification of the ordinary Thudichum's nasal speculum. The modification consists in the fact that the speculum is fixed to a stem, the handle of which can be held by the patient himself, thus liberating both hands of the operator.

From a recently published volume (vol. 3) of the Census Report for 1891, we gather that there were in England and Wales in that year 1492 deaf and dumb people. Of these the majority appear to be males until the age of seventy-five is reached, when the conditions as to sex are reversed.

In the *Lancet* of August 19th is a translation by Dr. St. Clair Thompson of a clinical lecture by Professor Adam Politzer on chronic suppuration of the middle ear.

In the same issue of the same journal, Mr. Richard Lake reports two interesting cases of diseases of the horizontal semicircular canal. The first was in a male, aged twenty, who had suffered from left otitis media, with suppuration, since childhood. On touching a polypus growing from the middle ear, vertigo of a side-to-side character ensued, and on removal of the polypus the patient nearly fell towards the opposite side. This vertigo was subsequently reproduced on touching the cicatrized stump of the polypus with a probe The second case was in a boy, aged thirteen, who had suffered from otitis for eleven years. Similar symptoms, together with lateral nystagmus, were produced on syringing through a sinus connected with the attic and external meatus. Mr. Lake bases his diagnosis largely upon the analogous conditions produced experimentally in animals on section of the horizontal semicircular canals.

In a clinical lecture at St. George's Hospital on the diagnosis and treatment of thrombus of the lateral sinus in connection with middle-ear disease, Mr. William H. Bennett has made a valuable contribution to our knowledge of the subject. The lecture was delivered on February 7, 1893, and is published in the *Lancet* of September 9, 1893, and is well worthy of careful study. Mr. Bennett tabulates the differential symptoms between acute mastoiditis and a thrombus in the sinus, and insists strongly upon the importance of localized tenderness over a small area in the immediate neighborhood of the mastoid foramen. Two interesting cases are quoted. In one, for reasons assigned, no operation was performed, and the patient died, Mr. Bennett expressing the belief that had surgical interference been undertaken, a different result might have been looked for. The second case quoted was more typical both symptomatically and in the success which attended the operation.

The operations referred to by Mr. Bennett have almost ceased to become mere surgical curiosities, but are rapidly being looked upon as routine methods of treatment, and included in the already long list of the triumphs of modern surgery; triumphs partly due to the discovery of anæsthetics, and partly to the introduction of antiseptic methods of operating. Hardly a week passes without the details of one or more of such operations being placed upon record. From August 19th to October 28, 1893, six cases were reported, excluding those referred to at the British Medical Meeting. Of these six cases only one died, and the recovery in the others appears to have been perfect in every sense.

In the *Lancet* of September 30, 1893, Mr. C. Mansell Moulin gives interesting details of the plan adopted by him in the removal of a naso-pharyngeal polypus attached to the internal pterygoid bone at its junction with the sphenoid. The essential point of the plan adopted appears to be that the skin is not entirely reflected from the surface of the superior maxilla, but the latter with the skin attached is freed from its connections and turned to one side, readily falling into its place again when the tumor has been removed. The operation was performed on December 3, 1892, and up to the time of writing there had been no recurrence of the growth, the parts had united very well, and the line of incision was in no way conspicuous.

A curious case of cholesteatoma of the auditory canal caused by a bug is recorded by R. E. Scholfield, M.A , M.B., in the *Lancet* of October 14, 1893.

The report of the Commission on Blind and Deaf Children is now almost a matter of ancient history, and it is upwards of three years since a bill was passed embodying their recommendations as applied to Scotland. On August 4, 1893, the corresponding measure for England and Wales was reported as amended to the House of Lords, so that it is just possible that the act will come into force in the course of the next twelve months. The English bill, though an improvement upon the existing state of affairs, is still much less satisfactory than the corresponding Scotch measure.

### APPOINTMENTS.

**Brook, Wm. Fred'k**, F.R.C.S. Eng., L.S.A., has been appointed Medical Officer for the Throat and Ear Department of the Swansea Hospital.

**Ridley, Walter**, M.B., M.S., F.R.C.S., has been appointed Surgeon for the Throat and Ear Department of the Royal Infirmary, Newcastle-on-Tyne.

# Book Reviews.

I.—Dr. L. JACOBSON, Privat-Docent in Berlin. **Text-book of Otology for Physicians and Students.** [Leipsic], Geo. Thieme, 1893. Abstract from the German review of Prof. H. STEINBRÜGGE in Giessen. By Dr. GEO. MORGENTHAU, Chicago.

The author is well qualified by his experience of sixteen years in the University Ear Clinic and Policlinic in Berlin, with its wealth of material, to add another German text-book on diseases of the ear to the already large number. Our attention is attracted by the eminently practical virtues of the volume. It is couched in clear and intelligible language, affording pleasant reading; all the more because the author selects the most important and essential parts, without lacking in completeness. The very sensible introduction, in which the great necessity of otological instruction for all physicians is justly urged, is followed by a longer division devoted to the anatomy of the ear, and general diagnosis and general therapeutics of aural diseases. More attention is justly given to the external and middle parts of the ear,—which have a greater practical bearing,—while the labyrinth is briefly described.

The chapter treating of the differential diagnosis between diseases of the apparatus for the conduction and for the perception of sound, proved of especial interest to the reviewer. He can but regret that Jacobson has disdained to quote him as holding the same view. Five years ago, in his article "On Tests with Tuning-Forks," he declared it to be his opinion that the conducting apparatus extends into the labyrinth; that, therefore, the apparatus for perception begins only with the nerve cells; that it is often impossible to differentiate between the various diseases of these parts on the anatomical and physiological basis; that functional diseases of the auditory nerve *cannot* be demonstrated by anatomical examination. He agrees fully with Jacobson that labyrinthine diseases are not of rare occurrence, and has always contended that labyrinthine complications are of much greater frequency in middle-ear affections than is generally held. Tests with tuning forks are insufficient just because they give us no information in regard to the frequently found combinations of middle- and inner-ear troubles. However, it must be acknowledged that Jacobson once again discusses these points frankly and clearly unlike most other treatises.

In the part devoted to "Special Pathology and Therapy of Aural Diseases," Jacobson distinguishes between Otit. med. simplex ac., Otit. med. ac. purulent., perforativ., and Otit. med. catarrh. ac. Since the author very justly concedes that there are "transitional forms" of middle-ear troubles, we might perhaps restrict ourselves to the division into so-called catarrhal and purulent inflammations untilabetter knowledge of the causes of diseases will permit a division on an etiological basis. In regard to therapeutic measures, there is hardly anything to be modified. The numerous prescriptions will prove of great assistance to beginners. All aural diseases, in their manifold aspects, are fully and concisely treated.

Three hundred and eighteen illustrations of the normal and pathological anatomy as well as of aural instruments, enhance the value of the work. Print and paper are exemplary. Altogether, the reviewer can commend the book highly to every one interested in the study of otology. He will find everything he needs in the most acceptable form.

II.—E. J. MOURE (Bordeaux): **Manuel Pratique des Malades des Fosses Nasales, de la Cavité Naso-Pharyngienne et des Sinus de la Face.** 2d Edition. Duodecimo, 602 pages with 127 figures in the text and four lithographic plates. Paris, O. Doin, 1893. Bound, 8 francs.

This second edition of Dr. Moure's book, completely remodelled and from 300 pages increased to 600, is brought up to date and presents the essentials of the new and vigorously growing specialty it treats of in a most attractive form. There is nothing heavy in it to weary the reader, even the most common diseases, such as coryza, are described interestingly. The anatomy of each part is clear and to the point, helping the student by very numerous, good illustrations. The book is introduced by chapters on the examination and general therapeutics of the nose and naso-pharynx, then follow the deformities, and an elaborate description of the special diseases in the classical manner, beginning with a definition of the disease, then discussing the etiology under the heading of predisposing and occasional causes; the symptomatology, as general and local signs; the course, duration, and termination of the disease; its differential diagnosis, complications, prognosis, pathological anatomy and, quite explicitly, with an abundance of practical rules, the treatment. The adherence to this dogmatic plan, with carefully arranged divisions and subdivisions, is greatly to the advantage of the student and practitioner. Many of the drawings, especially anatomical ones, are original. The individuality of the author shows most in the practical part, yet the literature is well considered, especially the German, less so the English and American. The book is what it aims to be, a *practical manual.*

H. K.

III.—Dr. Otto Körner: **Die Otitischen Erkrankungen des Hirns, der Hirnhäute und der Blutleiter.** (The Otitic Diseases of the Brain, the Meninges, and Venous Sinuses.) J. Alt, Frankfort-on-the-Main, 1894.

This handsomely printed 8vo volume of 163 pages is an "elaborate and critical presentation of the actual standpoint of our knowledge" of the above department of medicine. It is divided into a general (24 pages), and a special part (127 pages), with a good index.

The general part begins with statistical data, describes the anatomical conditions, the primary aural affections, and the influence of their location on the intracranial complications, the mechanism of the infection, and the prevention of otitic brain disease.

The special part treats of pachymeningitis and epidural abscess, otitic purulent leptomeningitis, aural and meningeal tubercular affections, sinus thrombosis, otitic pyemia and cerebral embolism, and otitic brain abscess. The latter occupies the bulk of the monograph, 68 pages. He describes in detail the diagnosis, pathology, and operations of otitic brain abscess, adding three not yet published cases, one from his own practice. He gives abstracts of all the cases thus far made public, omitting such as are only incidentally mentioned, all of which may fairly count as failures; for instance, Agnew[1] speaks of nine cases of otitic brain abscess operated on in Philadelphia, of which we only learn that all patients have died. Our author, p. 145, says: Of the 55 abscesses which thus far have been evacuated, 29 ended in recovery, 26 in death. The reviewer thinks that these statistics are unreliable, for the publications on which they are based are mostly made at too early a period to warrant the permanency of the recovery. They cannot, of course, be used to represent the mortality of the operation. The reviewer has two cases of his own: the one published in these ARCHIVES in 1892, fatal; the other, operated on three months ago, successful thus far.

---

[1] Transactions Am. Surg. Assoc., vol. ix., 1891.

Körner's monograph is exceedingly interesting reading. It leans on the well-known treatise (Hirnchirurgie) by Von Bergmann, 1889, but treats of the subject more from the standpoint of the aurist, which will make it particularly valuable to our readers.

H. K.

IV.—WM. MACEWEN, M.D., Glasgow: **Pyogenic Infective Diseases of the Brain and Spinal Cord—Meningitis, Abscess of the Brain and Infective Sinus Thrombosis.** London and New York, Macmillan & Co., 1893. $6.

V.—WM. MACEWEN, M.D., Glasgow: **Atlas of Head Sections.** Fifty-three engraved copper plates of frozen sections of the head, and fifty-three key-plates with descriptive texts. Macmillan & Co. $21.

For a long time the reviewer has not had such a genuine enjoyment, he may call it a medical treat, as that given him by the perusal of the above works. We say perusal for the exact study which has and is sure to follow requires more time than is at our disposal before the conclusion of the forthcoming number of these ARCHIVES. The atlas is a handsome volume of photogravures with explanatory key-plates opposite, showing in successive sections all the topographical relations concerned in the operations on the various parts of the head. "The surgeon who is about to perform an operation on the brain has in these cephalic sections a means of refreshing his memory regarding the position of the various structures he is about to encounter. At any spot which he may select for his operation he has the relation of the various parts of the brain to the outside of the skull exposed in three different series of sections—coronal, sagittal, and horizontal. In both the coronal and horizontal series the adult sections are supplemented by those of the child." The brief introduction gives some very valuable hints, perfect gems, regarding the practical points in the study of the plates.

The atlas is supplemented by the first named work, an 8vo volume of 354 pages, profusely illustrated by many excellent drawings. The two publications together form a library on this newest and most brilliant achievement in medical science and art.

CHAPTER I. gives a description of the surgical anatomy of the ear and brain, with many physiological and pathological observations. 48 pages.

CHAPTER II. Pathology of cerebral abscess and meningitis. Pp. 49–129.

CHAPTER III. Symptoms of abscess of brain and meningitis, excellent and exhaustive, with very many original illustrative cases (for instance, eight of word blindness and psychical deafness), the localizing symptoms of abscess in the temporo-sphenoidal and occipital lobes and the cerebellum. Elicitation of differential percussion notes. The three stages of abscess: initial, declared, and terminal. Differential diagnosis and prognosis. Pp. 130–225.

CHAPTER IV. Thrombosis of the intracranial sinuses. General and special description. Pp. 226–299.

CHAPTER V. Treatment. Detailed rules, not only for the performance of operations on the brain, but also those of the diseases of the ear, nose, or skull that are apt to lead to intracranial complications. Pp. 291–325.

CHAPTER VI. Results. After a short chronological statement, the author gives his own results.

Of 54 cases of mastoid operations, 43 cured, 11 relieved.

Seventeen cases of infective pachymeningitis externa in which operations were performed.

The granulation tissue covering the dura mater, and the pus, varying in quantity from a few drops to a couple of drachms, were removed. The extent of the tegmen and the sigmoid groove eradicated depended on the extent of the granulation tissue springing from the dura, sufficient bone being removed to expose, if possible, the limits of the pachymeningitis. All these 17 cases recovered.

Twelve cases of infective purulent lepto-meningitis, of which 6 were operated on and recovered; 5 being of the cerebral, 1 of the cerebellar fossa. Five cases exhibited symptoms of purulent lepto-meningitis at an early period. A free incision showed the tegmen eroded, the dura inflamed, softened, and bathed in pus; purulent intradural exudation escaped, generally in drops, and continued to ooze for some time. These cases recovered. Others, which were seen at a later period, were beyond hope, and died. Purulent lepto-meningitis is the most serious of the infective brain diseases, and hopeless when generalized.

Of 6 cases of cerebro-spinal lepto-meningitis, 5 were operated on with 1 recovery.

In 28 cases of infective sinus thrombosis which were operated on there were 8 deaths.

In 25 cases of abscess of the brain 19 were operated on, of which 18 recovered.

Of 30 cases of intracranial abscess, 17 were cerebral, 8 cerebellar, and 5 extradural.

The author evidently has given his whole soul to this work, and, apart from Horsley, perhaps, nobody has had a more extensive practice or better results. Enthusiasm only will inspire such an enterprise and sustain such indefatigable exertion both in the scientific and practical fields, but enthusiasm is also inclined to look at its achievements in a rosy light. How far or how little the results in the work under consideration are colored, our author lets the reader judge for himself by detailing 54 of his cases, an unprecedented number, and very interesting and instructive reading they are. His book certainly is the most advanced presentation of this department of medicine, written in the best scientific spirit, realistic throughout, and altogether fundamental.

H. K.

VI.—E. ZUCKERKANDL: **Normale und pathologische Anatomie der Nasenhöle und ihrer pneumatischen Anhänge.** First vol., 2d enlarged edition. Braumüller, Vienna, 1893.

The first volume of Zuckerkandl's classical treatise on the normal and pathological anatomy of the nasal fossæ and their pneumatic appendages appears in a revised and greatly enlarged edition, the text having been brought from 197 to 399 pages, the plates from 22 to 34. The chief supplements by which the present edition has been enriched are: 1st, a series of facts taken from the comparative anatomy of the osteology of the nasal cavities; and 2d, detailed descriptions, illustrated by many beautiful figures, of the vascular system and the histology of the nose. Our readers know how eminently scientific and practical this admirable work of the professor of anatomy at the Vienna University is. All we need do is to mention this new edition, which is sure to meet with the same enthusiastic welcome which the first edition received when it appeared in 1882 and which has been so extensively copied in text books and serial literature.

H. K.

VII.—CHAS. H. BURNETT: **System of Diseases of the Ear, Nose, and Throat.** Two octavo volumes of 789 and 858 pages respectively; illustrated. J. B. Lippincott, Philadelphia, 1893.

This large enterprise is a collection of monographs by a number of prominent workers in the various departments of ear, nose and throat surgery. Part I, the ear, begins with a very clear description of the anatomy and physiology of the ear, including the tests of hearing, by W. S. Bryant. Then follow articles on the examination of ears, with instruments and methods of their employment, by H. Richards; malformations, morbid growths and injuries of the auricle, by E. B. Dench; otitis externa, containing a very elaborate description of otitis externa parasitica, with drawings of a great variety of fungi, by R. Barclay; foreign bodies and osseous growths, by Sir W. B. Dalby; membrana tympani and acute otitis media, by Gorham Bacon; chronic catarrh, by Sam. Sexton; the middle ear affected from general diseases, by C. J. Colles; chronic purulent otitis media, by C. H. Burnett; removal of the stapes [an irrational operation] by F. L. Jack; inflammation of the mastoid, by Cl. J. Blake; diseases of the inner ear, by E. D. Spear; aural diseases in ocular and systemic disturbances, by C. A. Oliver and A. H. Cleveland.

In Part II., the nose and naso-pharynx, we find the following chapters: Anatomy and physiology, by A. W. MacCoy, with many old and poorly executed figures; methods of examination, by S. M. Dabney; general therapeutics, by Cl. Wagner; acute rhinitis, by F. H. Bosworth; influenza and American grippe, or epidemic myxoidœdema, by Carl Seiler; hypertrophic rhinitis, including hypertrophy of the pharyngeal tonsil, by R. W. Seiss; cirrhotic (atrophic) rhinitis, by J. N. Mackenzie; lupus, tuberculosis, syphilis, glanders, and diphtheria of the nares and naso-pharynx, by G. W. Major; foreign bodies in the nose and epistaxis, by Creswell Baber; diseases of the accessory sinuses of the nose, by J. H. Bryan.

The second volume continues Part II. as follows: Morbid growths and deformities of the nasal cavities, by C. Seiler; surgical procedures in deformities and neoplastic growths in the nose [very good], by W. C. Jarvis; hay-fever by F. H. Bosworth; neuroses of the nose and naso-pharynx [inordinately long], by J. S. White; diseases of the eye dependent on diseases of the nose, by G. M. Gould; skin diseases of the nose, by L. D. Bulkley.

Part III. treats of the diseases of the pharynx and larynx on 633 pages, distributing the labor among many laryngologists.

From the foregoing it is evident that we have before us a large work produced by a galaxy of authors, all men whom we would like to consult in the different departments which were allotted to them by the editor. The book, as a whole, is an excellent storehouse for reference, though, it seems to us, it disappoints in many particulars. Most of its text and the great majority of the drawings are either reproductions or remodellings of what we have read before. In regard to originality it falls short of similar books written by one author, say, for instance, the unexcelled treatise on the ear by Politzer and that on the nose and throat by Bosworth. If we compare it with works of its kind we have to mention Schwartze's Handbuch of ear disease, with which in many departments it vies in tedious prolixity of exposition, whereas in others it remains far behind the original, for instance, in the classical description of the operations on the ear by Schwartze himself.

H. K.

---

## OBITUARY.

I.—Dr. Robert Wreden, of St. Petersburg, died recently. He was one of the most prominent aurists of Russia, our esteemed collaborator, and a very meritorious contributor to otology, as his paper on "Myringo-mycosis Aspergillina" (These Archives, iv., 261), and "On the Etiology and Diagnosis of Phlebitis of the Cavernous Sinuses, and the Value of the Thermometer in Diagnosis of Cerebral Complications of Purulent Otitis" (These Archives, v., p. 75, 1876), and articles on "Thrombosis" and "Phlebitis Sinuum Duræ Matris" (*Petersb. med. Zeitsch.*, 1869), testify. Honor to his name.

II.—Dr. Giuseppe Sapolini, the Nestor of Italian aurists, died in Milan, June 3, 1893. Among his publications the most important is on the Nervus Wrisbergii and the Chorda Tympani, which he called the XIIIth pair of cranial nerves. In 1882 he founded, by a donation of 10,000 frs., an hygienic museum at Milan, which now bears his name, and to which he left a legacy of 90,000 fr.

# SUPPLEMENT TO THE PAPER "ON SERO-MUCOUS CYSTS BENEATH THE WING OF THE NOSE," PAGE 67, ETC., OF THE PRESENT VOLUME.

By HERMAN KNAPP.

WHEN the printing of this number was almost completed, a report of " A Case of Cystic Tumor of the Floor of the Nose," by John Dunn, M.D., of Richmond, Va., appeared in the issue of Feb. 24, 1894, of the *N. Y. Medical Journal.* As this communication adds another to the few cases thus far made public in American medical literature, as far as I know, I beg to present it, in abstract, as a supplement to my short paper on this anomaly.

A woman of twenty-six years noticed, three months before she presented herself, a small swelling "in the corner of her nose." It grew steadily. Dr. Dunn found the cheek near the left ala nasi unduly prominent, the suture in a measure obliterated. In the nostril an oblong, fluctuating, painless tumor extended from the septum to the outer wall, ¾″ backward, ¼″ in depth. A hypodermic needle thrust into the tumor removed a syringeful of a thick, transparent, yellowish fluid. The tumor was opened with a knife, its contents forced out, and the cavity packed with a $\frac{1}{4000}$ solution of bichloride of mercury. For a few days the cavity was washed out daily with a boric acid solution, then with tincture of iodine, following which it gradually diminished in size, until, in five weeks, a complete cure resulted.

Dr. Dunn, finding no connection of the swelling with any of the neighboring structures, thinks that it must be classed as a retention cyst of the floor of the nose. As to its cure, he says: " In regard to the treatment of these cystic tumors (ranula, etc.), I would say the best results obtained at my hands have been from excising a portion of the sac wall, filling the sac with tincture of iodine, which is immediately washed out, and then packing the sac with cotton, which is to be changed daily until obliteration of the sac has taken place." This would be according to what I have called the second method of treatment: destruction of the interior surface of the cyst by heat or chemicals. It is a simpler operation than the extirpation, but slower in healing, and open to relapses, especially if the lateral part, which extends underneath the ala nasi under the cheek, is not quite small. The treatment of Dr. Dunn's case lasted five weeks, and his article, announcing the perfect cure by the last of December, '93, appeared in print as early as Feb. 24, '94.

# SUPPLEMENT TO THE COMMUNICATION OF "REMOVAL OF SEQUESTRA AND A TOOTH FROM THE FLOOR OF THE NOSE."

By HERMAN KNAPP.

WHEN I read the above communication before the N. Y. Laryngological Society on Feb. 28, '94, Dr. Jonathan Wright, of Brooklyn, mentioned that he had published two personal cases, and referred to several others in an article contained in the issue of Oct. 12, 1889, of *The Med. Record.* As this article had escaped my notice I take the liberty of copying from it what is essential to the above subject.

The presence of a tooth in the nose is a very rare circumstance. There is a record of one case,[1] where a right upper canine tooth was removed from the left orbit of a child. This was evidently a dentigerous cyst, which must have begun development at a very early stage of embryonic life. Many cases of dentigerous cysts have been reported, and they are not by any means confined to the maxillary regions.

Dr. Wyeth,[2] several years ago, reported to the New York Pathological Society a case in which a displaced tooth was found in the antrum of Highmore. Dr. Griffin[3] found a tooth growing upward in the nose in a case of cleft palate. This produced no symptoms. Dr. Marshall,[4] and Dr. Ingalls,[5] of Chicago, have each reported a case in which the tooth had apparently ulcerated through into the nose, from the upper jaw. It is doubtful how the teeth in the cases reported by Schaeffer,[1] Roy,[2] and Hall[3] became nasal inhabitants. These six cases are all that I have been able to find recorded, after a careful search, though other reports may have been overlooked. In all the cases reported the teeth were the anterior ones, canines or incisors; and the reasons are obvious, since the posterior ones, if inverted, as in Griffin's case, would grow into the antrum, and probably produce no symptoms. I have seen skulls in which a tooth had attained full growth within the alveolar process of the superior maxilla without emerging from the bone at any point. Where ulceration takes place, the progress of a bicuspid or tricuspid upward would be very unlikely to occur, from the shape of its root. If it should occur, as in the case of Wyeth, it would, from its situation, be most likely to be discharged into the antrum.

---

[1] Cousins, J. B.: *British Medical Journal*, 1887, p. 873.
[2] Wyeth: *New York Medical Journal*, November 24, 1883.
[3] Griffin: *New York Medical Record*, March 13, 1886.
[4] Marshall: *Journal of American Medical Association*, November 6, 1886.
[5] Ingalls: *Journal of American Medical Association*, February 23, 1884.

The first of the cases related here is instructive as illustrating the migration of an object through bony structure, while the second case was evidently originally one of extra-alveolar development.

CASE I.—Mary V——, aged thirty-five; married; came to the Demilt Dispensary February 21, 1888. Four years previously she had all her remaining teeth, nine in number, extracted from the upper jaw. The last one, a lateral incisor or canine, on the left side, she had extracted during nitrous oxide narcosis. The dentist told her he thought he had left a piece behind, but could not detect it on probing. There was a good deal of gingival tenderness afterward, which soon subsided. Six months later, the left side of her nose began to trouble her, by being "stopped up" at times, and there was a slight discharge. For the last six months the nose on the left side had been painful and sensitive. An intra-nasal examination showed marked hypertrophy of the nasal mucous membrane on the left side. It was red and inflamed, and bled easily. A probe detected a rough, hard surface about an inch and a half from the left anterior meatus, on the floor of the nose and close to the septum. The patient was given an alkaline wash with a syringe. Two weeks later she again presented herself, bringing with her a small, flat, sequestrum which she had washed out of her nose. After the thorough application of cocaine, by means of a probe and the forceps the single root of a tooth, about three fourths of an inch long, was extracted from the left nostril. The nasal symptoms soon subsided.

---

[1] Schaeffer: *Deutsche Med. Woch.*, No. 2, 1883.
[2] Roy: *London Lancet*, November 3, 1883.
[3] Hall: *London Lancet*, November 17, 1883.

Case II.[1]—Mary F——, aged eight. From her second year the nose had been stopped up so as to prevent nasal breathing. There had been considerable offensive discharge. The bridge of the nose was sunken. The nostrils were flattened and contracted. The superior alveolar process on the left side, corresponding to the situation of the incisor and canine teeth, was absent, leaving a slight cleft. No history of accident could be obtained, the mother stating that she had never noticed the defect before. The left nostril was obstructed by a foreign body, which gave a grating sound on the impingement of a probe. Considerable force was necessary to extract it with the forceps. It was found to be the crown of an incisor tooth. It was notched, as in young children, and larger than in a child a year old. There was considerable calcareous matter around it and in the nostril, but no root was found. The patient's nasal symptoms had very markedly abated at the next visit, and since then she has not been seen.

---

[1] This case came under the observation of my assistant, Dr. F. A. Manning, during my absence. To him I am indebted for the notes of the case.

*Erratum.*—On page 68, sixteen lines from below read: " smooth resistent walls " instead of " small resistent walls."

# CONTENTS OF VOLUME XXIII., NUMBER 3.

1. A Case of Otitic Brain Abscess (Chronic Otorrhœa, Optic Neuritis, Homonymous Hemianopsia. Opening of Mastoid and Skull. Cerebral Hernia. Recovery). By Dr. Herman Knapp, of New York . . . . . . . . . . . . . . 155
2. Can Important Topographical Relations of the Temporal Bone be Determined from the Form of the Skull? As Answered in Part by Five Hundred Skull Measurements. By Dr. B. Alexander Randall, Philadelphia. (With three figures in the text) . . 162
3. Investigations with Tuning-Forks of Middle Register in Over Six Hundred Cases. By Henry A. Alderton, M.D., Brooklyn, N.Y., 171
4. Three Fatal Cases of Otitic Intra-Cranial Complications. By Prof. S. Moos, Heidelberg. Translated by Geo. L. Morgenthau, Chicago, Ill. . . . . . . . . . . . . . 198
5. Bilateral Hæmatoma of the Lobule. By Dr. B. Alex. Randall, Philadelphia . . . . . . . . . . . . 207
6. A Case of Basal Fracture. By John Dunn, M.D., Richmond, Va., 209
7. A Case of Otitis Hemorrhagica Externa. By John Dunn, M.D., Richmond, Va. . . . . . . . . . . . . 211
8. Investigations Concerning the Average Hearing Power of the Aged. By Prof. F. Bezold, Munich. Translated by Dr. S. E. Allen, Cincinnati . . . . . . . . . . . . . 214
9. The Presbycusic Law. By Dr. H. Zwaardemaker, Utrecht. Translated by Dr. S. E. Allen, Cincinnati. (With Plates II., III., and IV., of vol. xxiv., German Edition) . . . . 228
10. A Hitherto Undescribed Course of a Disease of the Mastoid Process. By Dr. S. Moos, Heidelberg. Translated by Dr. J. A. Spalding, Portland, Me. (With three Figures on Plates V. and VI. of vol. xxiv., German Edition) . . . . . . . 235
11. Book Review . . . . . . . . . . . . . . 241
    Atlas of Laryngology and Rhinology. By A. Gouguenheim and J. Glover.
12. British Notes . . . . . . . . . . . . . 245
13. Obituary . . . . . . . . . . . . . 253

Plate I., vol. xxiv., German Edition. To illustrate the paper by Prof. Bezold in the preceding number.

# NOTICE TO CONTRIBUTORS.

The editors and publishers of the ARCHIVES beg to offer some suggestions to authors who propose to favor them with their contributions.

1. As original communications the ARCHIVES can accept only such papers as have never been printed nor are intended to be printed in other journals. If a preliminary communication on the subject of a paper has been published, the author is requested to state this in the letter accompanying his manuscript. It is understood that contributors to these ARCHIVES and editors of other periodicals will make no abstracts of the original papers published in this journal without giving it due credit for the same.

2. Authors will receive gratuitously twenty-five reprints of their articles. If a greater number is desired,—notice of which should be given at the head of the manuscript,—only the additional cost of presswork and paper will be charged to the author.

3. In preparing manuscript for the compositor it is requested that the following rules be adhered to:

*a.* Write on one side of the paper only.

*b.* Write without breaks, *i. e.* do not begin a new sentence on a new line. When you want to begin a new line or paragraph at a given word, place before it in your MS. the sign ¶.

*c.* Draw a line along the margin of such paragraphs as should be printed in smaller type—for instance, all that is clinical history in reports of cases, etc.

*d.* Words to be printed in *italics*, should be underscored once, in SMALL CAPITALS twice, in LARGE CAPITALS three times.

4. Authors may receive proofs for revision if they will kindly return them without delay. We beg however to remind our contributors that changes in the copy are equivalent to resetting, causing so much additional expense. We therefore request them, to make, if possible, no alterations at all in their MSS., or, at least, to limit these to what is of essential importance.

VOL. XXIII. No. 3.

# ARCHIVES OF OTOLOGY.

## A CASE OF OTITIC BRAIN ABSCESS (CHRONIC OTORRHŒA, OPTIC NEURITIS, HOMONYMOUS HEMIANOPSIA. OPENING OF MASTOID AND SKULL. CEREBRAL HERNIA. RECOVERY).

BY DR. HERMAN KNAPP, OF NEW YORK.[1]

Nov. 23, 1893, Mrs. John Burckhardt, of Long Island City, brought to me her nine-year-old daughter Mamie, with a letter from her physician, Dr. Anderson, which informed me that the child had been seen in consultation by Dr. Wm. Cowen and Dr. Fred. Peterson, of New York, who, from the aural and general symptoms and the presence of choked disc, had diagnosticated an intracranial abscess.

The thin, but otherwise healthy-looking child, whose father seems to be consumptive, had suffered for years from left-sided otorrhœa. For the last eight weeks there had been copious and offensive discharge, severe headache and some dizziness, with a temperature ranging from 98.4° to 101°.

I found the drumhead largely perforated, white-infiltrated, no swelling of the walls of the meatus. Mastoid neither swollen nor tender. No sensitiveness on percussion of the skull. Right ear in structure and hearing normal. Left ear $h = 0$, $v = \frac{1}{60}$, both ears closed $\frac{\frac{1}{2}}{60}$. Choked disc marked in the left, moderate in the right eye. My assistant, Dr. W. A. Holden, whom I asked to examine her vision, reported $S = \frac{20}{20}$ in each eye ; homonymous, right-sided hemianopsia, the left half of the field of vision in both eyes normal ; no hemianopsic pupillary reaction. I could easily confirm this statement ; the answers of the child were clear, the lines of separation of the blind and seeing halves of each field lay in the vertical meridian. I ordered an ice-bag on the mastoid, and syringing the ear with warm boric-acid water every few hours.

---

[1] Read in abstract before the American Otological Society, at Washington, D. C., May 29, 1894.

I asked the mother to permit me to present her child at my clinic at the College of Physicians and Surgeons. She came there a few days later, and I found the child much better in respect to her general symptoms; less headache, temperature almost always normal; otorrhœa copious and very offensive. The choked disc in the left eye and the hemianopsia were the same, but the swelling of the right optic disc had diminished. I told the students that I showed them the case to impress them with the idea that practically there was no such thing as specialism in medicine. Division of labor was legitimate and useful in medicine as in other departments of human work, but nobody who had educated himself in a specialty, at the expense of his general knowledge, could competently handle the majority of the patients in his own field. The little patient before them was etiologically a case of general practice—scarlatina, which, as a sequel, left a chronic ear disease; this in its extension had caused a brain trouble, the existence of which had been ascertained with the ophthalmoscope (choked disc); its differential diagnosis (between meningitis, sinus thrombosis, and abscess) lay in the sphere of the neurologist; and the seat of the disease, in our case the abscess, had been determined by the functional examination of the eye; whereas the cure, which in the case before them meant nothing less than the saving of life, could only be accomplished by the hand of the surgeon. I told the students why the existence of meningitis and sinus thrombosis could be excluded. The homonymous hemianopsia indicated the destruction of the optic-nerve fibres somewhere between the chiasm and the visual centre, the cuneus. The integrity of all other cranial nerves made it likely that it was situated in the cuneus or near it, in the occipital lobe. Dr. Fred. Peterson, who was present, and whom I asked for his opinion, said it might as well be in the optic radiation. This opinion I adopted so much the more willingly, as the optic-nerve fibres, in their course from the external geniculate bodies to the cuneus, pass through the temporo-sphenoidal lobe, in which, as experience has shown, the majority of otitic abscesses (about 66 per cent.) are located.

I ordered continuance of the treatment. Not having heard anything of the child for two weeks, I wrote to the father that, in my opinion, his little daughter suffered from a fatal disease which could be cured by a surgical operation only; whether he would not let me examine her again. He answered, "willingly," and I asked my colleague, Dr. M. A. Starr, to kindly see the child with me.

This was done at my office on December 10, 1893.

S $\frac{20}{20}$ each, homonymous hemianopsia as before. Mobility of eyes and pupil normal; optic disc in right eye almost normal, in left markedly choked, yet less than last time. Child has apparently been quite well, plays, sings, and has no discomfort. No indigestion, no constipation; no mental trouble; child reads and pronounces well. Several weeks ago her memory was feeble, and she could not recollect the names of her schoolmates, though she recognized them at once. Now her memory is good, she reads and knows what she reads. Her pulse is 120, and her temperature 100.2° at 3 P.M. A large perforation in the drum membrane. A probe can be introduced a short distance into the posterior part of the tympanic cavity toward the mastoid antrum; no dead bone felt. The mastoid is slightly swollen and red, the tip tender on pressure. At the suggestion of Dr. Starr we tried Macewen's symptom and found it present, namely on applying our ear to the vertex of the patient, we heard the percussion of symmetrical points of the skull stronger on the left than on the right side.[1]

Dr. Starr and myself were of the opinion that we had to deal with an otitic brain abscess which should be opened. The father consented. The operation was done the next day, in the operating rooms of the N. Y. Ophthalmic and Aural Institute. Dr. Starr was kind enough to be present. It was quite a privilege for me to have his opinion in the discussion of the different phases of the operation, which from the shaving of the skull to the end of the dressing lasted almost three hours.

I began the operation with chiselling the mastoid open, making what is called the radical operation. The object was first of all to clear the ear of all the carious and necrosed bone, mortified tissue, and inspissated and decomposed secretions which, in a vicious circle, kept up the morbid process. The mastoid was compact, though rather soft. Two to three millimeters below the bone surface the lateral sinus came into view. It looked blue, healthy, and pulsated. I chiselled, around it, all the bony wall away, until I came into a small cavity, the antrum. From there I passed a bent probe through the neck of the antrum, into the tympanic attic, and chiselled a groove through the bone, protecting the facial canal with a bent probe, and connecting the antrum with the attic. With a sharp spoon I now carefully cleansed the antrum and the attic, removing a good deal of brittle bone-tissue and cheesy, offensive material. When the walls of these cavities felt firm and hard like healthy bone, I desisted from going any farther in this direction. The offensive pus which during the first part of the operation escaped copiously through the ear canal, suddenly ceased to flow. It evidently came through the roof of the attic, but no fistula or trace of its course could be detected.

---

[1] See Wm. Macewen's book, *Pyogenic Infectious Diseases of the Brain and Spinal Cord*, 1893, p. 146. Elicitation of a Differential Cranial Percussion Note.

Two hours had elapsed in this tedious chiselling; my assistants grew tired, but convinced that an abscess was in the brain I did not want to stop here and leave the operation half done. I enlarged the skin wound upward and opened the skull in the usual place, above and behind the ear canal, with a trephine 2.5 *cm* in diameter. When the piece of bone was removed a healthy strongly pulsating dura mater presented; no softness on pressure indicated the presence of pus. I enlarged the wound with a rongeur, making its diameter over 3 centimetres. Then I incised the dura and found the pia and brain unchanged. Now I thrust the somewhat thick and long needle of a large hypodermic syringe 3-4 *cm* into the brain substance, from above and behind, down and forward toward the ear canal. There was no resistance at any place. I drew the piston up and the syringe at once filled with pus. Without withdrawing the needle I opened the abscess at once by thrusting a long-bladed knife along the needle until the pus flowed out freely. It was impossible to prevent the meninges and the edges of the trephine canal from being contaminated with the greenish-yellow, very offensive pus. When there was no further escape, the wound was cleansed with absorbent cotton, which had been wetted with a 1:5000 corrosive sublimate solution. The dura was put in its place, a hard rubber drainage tube inserted into the wound, and the region covered with sublimate gauze and absorbent cotton, held in position by a flannel roller.

The little patient, who had been under ether all that time, rallied quickly, felt no collapse, was carried to her bed, and soon slept soundly.

The after treatment was long and laborious. The pulse accelerated (135-160), and the temperature rose during the following days (102.5°). The patient had no appetite, was very thirsty, but had neither pain nor any particular discomfort. The optic neuritis increased considerably. A perforated silver tube was kept in the ear canal, in order to keep the caliber of the canal free. The ear was syringed daily. It discharged pus freely, as did also the skull wound through the drainage tube, which was removed and replaced by a new one daily. From the third day the brain began to protrude through the perforation in the skull, more and more until the hernia reached the size of a goose's egg. The thick bandage was bathed in cerebro-spinal liquid which flowed freely through the upper part of the wound. Two sloughs made their appearance on the surface of the brain hernia, which I scraped off with a sharp spoon. Judging from the feel of fluctuation on palpitation, the continuance of the fever, and the increase of the optic neuritis, that there was probably another abscess or two in the temporo-sphenoidal lobe, I thrust a narrow knife into the brain substance under the sloughs, no deeper, however, than 2.5 *cm* lest I might open the lateral sinus. No result; but the next day there was a free discharge of pus from these incisions.

Now the *recovery began*, slowly but steadily. The flow of arachnoid liquid diminished and ceased in the third week, the prolapsed brain substance was red, but perfectly clean. It was cleansed daily, *i.e.*, irrigated with boric-acid water, strewn with impalpable boric-acid powder, covered with corrosive sublimate gauze, on which vaseline had been spread. In the fourth week the discharge from the ear and the brain diminished and soon stopped. The drainage tubes were left off. The patient felt better, ate and slept well, lost her thirst, had a morning temperature of 98.5° to 98.9°, an evening temperature of 99° to 100.3°. Pulse about 120. Gradually the pulse slowed, but the temperature remained 99° and 100° for more than two months. The cerebral hernia remained as large as a goose's egg for over six weeks, then it began to diminish, the skin crept over it from the border, and it became evident that the hernia was being gradually drawn back into the cranial cavity. Its surface was covered with healthy skin, on which the pulsations of the brain were still visible. The optic neuritis in both eyes began to diminish in the second month and had disappeared in the third. The hemianopsia has remained. The sight is the same. It is doubtful whether she has any hearing in the ear operated on. She repeats words at a distance of twelve feet, but also at six to eight feet when both ears are closed. Her intellect is unimpaired. She is gay and lively, betraying, apart from her hemianopsia, in no way that her brain has suffered so seriously. She was kept at the hospital until March 22d, a little over three months, longer than was perhaps, necessary, but I wanted no imprudence or neglect to interfere with her recovery.

June 21, 1894, I saw her last. There are now no symptoms of brain disease, and the child is as well and lively as ever. In the depth of the ear canal there is still some secretion brought out with the cotton-tipped probe. This still requires the aurist's care, though the ear canal is wide and there is no polypus and no rough bone. The recovery will be complete only when there is no secretion and the bones are covered with cicatricial tissue.

As far as I can make out only one other case of cerebral abscess from ear disease has been operated on successfully in this country. Dr. L. A. Stimson published a case, March 30, 1891, in the *N. Y. Medical Journal*, cited in Starr's book (*Brain Surgery*, p. 194). He went through the bone with a chisel above and slightly behind the external auditory meatus. An incision through the dura gave exit to about three ounces of pus. The finger passed freely upward and downward. It was thought that an abscess had formed between the meninges, and not in the substance of the brain, and that it had especially compressed the posterior part of the temporal lobe in its inferior and outer surfaces. The patient eventually recovered entirely. Such cases are not so rarely successful. I have published some from my own practice. They get well when the pneumatic spaces behind and above the ear are freely opened and drained. They are the result of more or less extensive caries and necrosis in the roof and adjacent parts of the tympanum and mastoid process. The pus forms in the bottom of the middle or posterior cranial fossa, but travels also around the base of the petrous bone occupying both fossæ. I have seen this in a number of specimens.

The other case I alluded to above, is published in the April number of this year of the *Annals of Ophthalmology* *and Otology*, 1894. It was under the care of Dr. Chas. H. Burnett, and operated on by Dr. De Forest Willard of Philadelphia. The case was particularly interesting from the fact that the presence of the abscess could be well enough diagnosticated, but its location remained doubtful even as to which hemisphere it was in (both ears being affected) until paralytic symptoms fixed it in the neighborhood of the motor centre of one, in which it was readily found by the operation.

# CAN IMPORTANT TOPOGRAPHICAL RELATIONS OF THE TEMPORAL BONE BE DETERMINED FROM THE FORM OF THE SKULL? AS ANSWERED IN PART BY FIVE HUNDRED SKULL-MEASUREMENTS.

BY DR. B. ALEXANDER RANDALL, PHILADELPHIA.

(*With three figures in the text.*)

THE affirmative answer which was given to this interesting question by Dr. Otto Koerner in these ARCHIVES, vol. xvi., p. 281, on a basis of sixty skull-measurements, enlisted at once the co-operation of the writer to put to further test the findings there set forth. A number of considerations delayed any decided effort to pursue the study, as it seemed important to make it fairly complete in its details and wide in its basis; and the contrary findings of Schueltzke and his divergent methods, raised further questions as to the best means to be employed in the research.

Koerner's method of orthographic projection necessitated sagittal division of the skull and limited too narrowly the extent of the material employed; while in the choice of the points selected for measurement its application is open to a huge personal equation, wholly undermining its conceded accuracy in other respects. Measurement by calipers, as done by Schueltzke and myself, has its confessed imperfections as applied to the undivided skull, since there is often an obliquity in the placing of the points which slightly exaggerates the minimum thickness of the bone at the place measured. Yet this is rarely if ever more than a fraction of a millimetre, and varies from case to case in still more microscopic proportions. It can be absolutely asserted as to the figures that follow that in no single instance are they more than one millimetre astray in the larger dimensions, except that from sulcus to sulcus, which has been found at times as much as 2 *mm.* in error, and that in the small dimensions the data are accurate to a small fraction of a millimetre.[1] If any operator desires minuter approximations by which to guide his procedures, he is welcome to make more hair-splitting measurements for himself, as Koerner has more recently done to tenths of a millimetre on twenty-seven skulls. It is regrettable that these infinitely accurate results have so little practical use.

Studying the matter with the object of obtaining guiding anatomical facts, irrespective of proving or disproving the theory of Koerner, it has seemed of prime importance to employ a method sufficiently accurate to meet the needs of the surgeon, and applicable to almost any and every skull. Such a method and the instruments devised for applying it, was presented for criticism at the meeting of the American Otological Society in 1892, with illustrative data as to 122 skulls in the Hyrtl Collection in the College of Physicians of Philadelphia. The wider work embracing the available specimens in the Museums of the University and the Academy of Natural Sciences in Philadelphia and the United States Army (in Washington), has been carried forward to the extent of only one half of the intended one thousand; but has been presented in full detail in the transactions of the Pan-American Congress, so as to be fully available to others. Every specimen can be identified by its museum number, and any errors which I have made thus easily detected. As an aurist dealing principally with Caucasian races, such skulls were at first selected; and only when all such had been utilized were the unknown, aboriginal, or other unusual and perhaps unpractical specimens used. Finally, some selection of extreme types seemed admissible to fill out the series more symmetrically, every skull having the desired index being taken as it was found, irrespective of the showing made by its further mensuration.

---

[1] Koerner challenges my method and results (in this Journal, xxiv., p. 173, German edition) because absolute accuracy is not claimed and because his law can be demonstrated only upon the rare extreme forms. Rejoinder is needless.

As one thousand skulls seem small enough a series upon which to base any wide-reaching law which is expected to guide the surgeon, I hope that others will complete what has been thus begun, as it is not improbable that I cannot devote more time to the exacting study.

In the detailed presentation of my results, the effort has been made to offer to fellow-students each individual skull in all its important dimensions, leaving them to draw all conclusions for themselves. Hence the height is given as a check upon the introduction of deformed crania, the breadth between the parietal tuberosities for those who reject the inter-parietal maximum as giving the *index* when divided by the maximum length—the breadth at the *spina supra meatum* and at the "operation point" 5 *mm* behind it—the extreme separation of the sigmoid sulci and the minimum thickness of bone overlying each, and the distance of this thinnest point back of the *spina* upon each side—so that for every skull a scheme like the accompanying (Fig. 1.) can be constructed, showing the relations throughout. Others may differ in their methods of mensuration and in the points determined; but some at least of these must be measured, and the results will be thus far comparable. The height of the floor of the middle cerebral fossa above the *spina* was also determined with calipers and the relation of this lowest point within or beyond the *spina* was also recorded.

It is needless here to present the detailed findings elsewhere given; nor will I attempt to deduce laws of universal applicability from material which seems still insufficient; nor on the basis of the averages thus far obtained combat the theory of Koerner. Wider research may prove the correctness of his generalization. Yet it seems not invidious but of practical importance to see how far the facts which I have obtained accord with his results; and how far, as surgeons, we could have been aided or misled had we endeavored to apply his law to the individual skulls making up the series which I have studied.

Mesocephalic crania, or types approximating this, will doubtless always predominate in the operative work of European and American surgeons, although the negro and other stocks will furnish exceptions. The findings in 80 such skulls (index .777 to .779), as also the averages in the entire 500 have, therefore, considerable practical bearing.

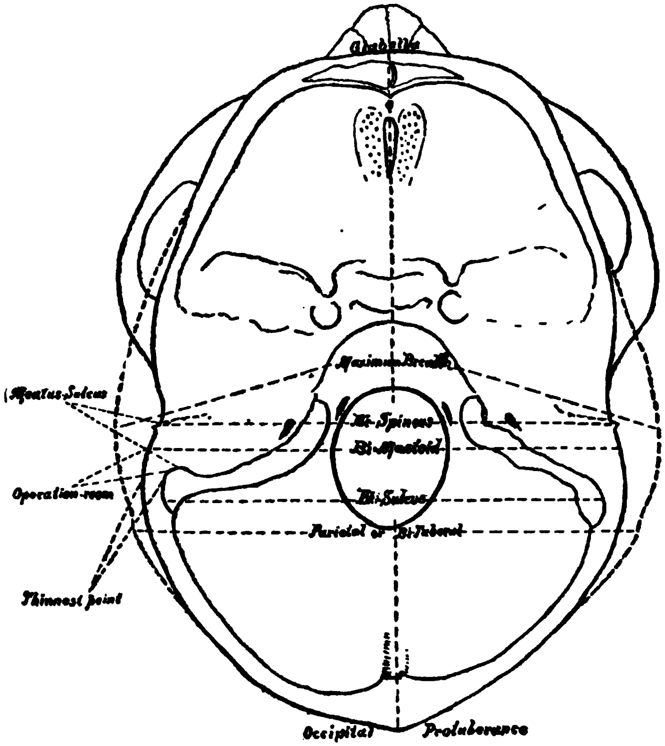


FIG. I.

Scheme showing the most important dimensions of a skull in the writer's collection.

The height of the floor of the middle cerebral fossa was measured in the vertical plane of the *spinæ* and in relation to them as the fixed points, as being more practical as well as more definite than its distance from the meatus, especially in its deeper portions; and this lowest position was located laterally, as thus much within or beyond the *spina*. In the 80 mesocephalic skulls, this floor averaged 6.27 *mm* (18 to 0) above the *spina* on the right, and 5.94 *mm* (13 to 1) on the left side; being higher on the right in 41, on the left in 18, and equal in 21. Among the total 500 this height averaged 6.6 *mm* (18 to 0) right, 5.6 *mm* (15 to 0) left; being higher on the right with a maximum difference of 7 *mm*, 287 times, on the left (maximum difference, 5 *mm*) 102 times, and of equal height in 111. For the 210 brachycephalic skulls (index .780 to .97) and for the like number of dolichocephalic (.610 to .776), the average figures were almost identical with each other and with the general average. Selecting the 40 crania at each extreme of the series, we find for the ultra-dolichocephalic (index .61 to .71) an average of 5.42 *mm* (14 to 0) on the right and 5.87 *mm* (14 to 0) left; with the right fossa higher in 13, the left in 17, and equality in 10. This ghost of a confirmation of Koerner's law is overshadowed by the finding in the 40 ultra-brachycephalic (index .87 to .97), where the height averaged 6.6 *mm* (15 to 0) on the right, and 6 (15 to 0) *mm* on the left; with the right higher in 20, the left in 12, and the two sides equal in 8. Inconclusive as my figures may be in some respects, they certainly show that the middle cerebral fossa may be found at any height up to 15 *mm* above the *spina* on either side and in any type of skull, and it is rarely, if ever, below this landmark. That it was found lower on the left and in the dolichocephalic cranium on the average, shows the accidental character of Koerner's findings, but does not establish a law to the contradiction of his.

The thin point where the lateral sinus most nearly approaches the surface is found in the mesocephalic to average in thickness 6.17 *mm* (15 to 1) on the right, and 6.89 *mm* (18 to 2) on the left, being greater on the right in 22, on the left in 42, and equal in 16. In the total 500, the average was 6.1 (20 to 0) right, and 6.6 *mm* (18 to 0) left; it was thicker on the right in 151, on the left in 231, and equal in 118—the maximum difference being 6 *mm* for each side. This confirmation of Koerner's finding loses its scant importance when we note, as he has neglected to follow Bezold in doing, that this thinest point lies generally well back of the operation-track, averaging 17.8 *mm* behind the *spina* (40

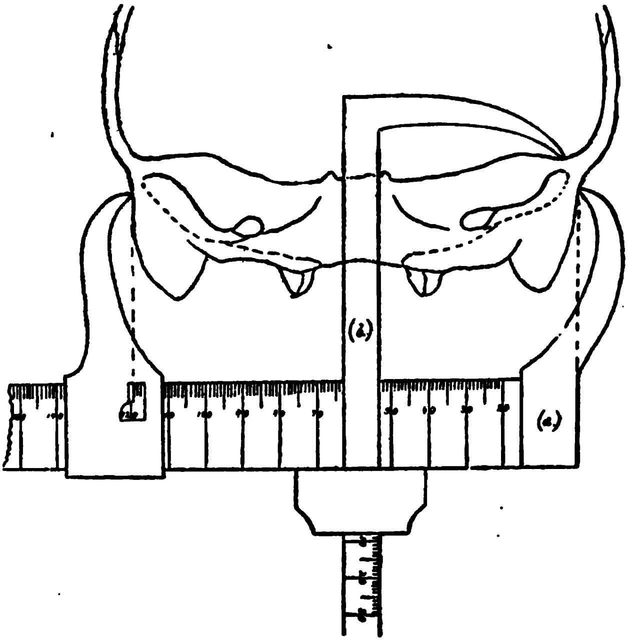


FIG. 2.

**Scheme of the instrument employed to locate the lowest portion of the floor of the middle cerebral fossa and measure its relation to the spina supra meatum.**

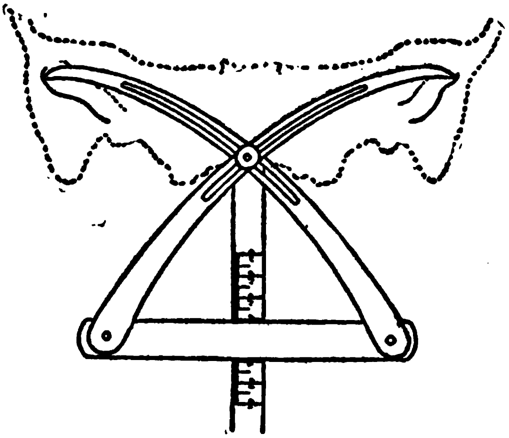


FIG. 3.

**Inside calipers employed to measure the maximum distance between the sigmoid sulci.**

to 0.5) on the right, and 17 *mm* (35 to 1) on the left in the 500; with slightly more difference in the mesocephalic (18.3 right, 16.8 left) and minima of 4 *mm* and 5 *mm* respectively. So, also, in the general groups of the long and the broad heads, the slightly more superficial position of the sinus in the brachycephalic and on the right side was neutralized by its more anterior position on the left and in the dolichocephalic. In the extreme examples of each type, the general finding was reversed, and the 40 ultra-broad skulls averaged 6.95 *mm* right and 7.53 *mm* left, as against 6.43 *mm* and 6.82 mm. in the 40 ultra-long. In each group the right was thinner in 11, the left in 19, skulls.

Turning to the figures for the distance between the sulcus and the posterior wall of the canal—a far more important dimension, since it defines the posterior limit of the field of operation—we find that here also there is generally less room on the right. In the 500 skulls it averaged 12.1 *mm* (21 to 0) right, 12.5 *mm* (25 to 0.2) left—being greater on the right (max. 6 *mm*) in 153, on the left (max. 8 *mm*) in 201, and equal in 146. The 80 mesocephalic crania showed less extreme dimensions and slightly greater space—12.55 *mm* (18 to 6) right, and 12.75 mm. (20 to 6) left. The large group of the long and broad heads again nearly corresponded with each other and with the general average, except that on the right the dolichocephalic had a lower average than the brachycephalic—11.4 *mm*: 12.3 *mm*. This was still more marked in the extreme examples, being 11.38 *mm* (20 to 0) right, and 12.7 *mm* (25 to 0.2) left in the 40 longest crania, but 12.95 *mm* (18 to 7) right, and 13.12 *mm* (18 to 3) left in the 40 broadest. It seems very noteworthy that 7 *mm* was the minimum meatus-sulcus distance found on the right side in the 60 most brachycephalic skulls (index .86 and over) which I have measured.

Important as are the foregoing data, another question naturally comes first to the mind of the surgeon when he has laid bare the mastoid and placed his chisel upon it ready to enter: How far is my instrument from the lateral sinus? This dimension has been determined for a point 5 *mm.* horizontally back of the *spina* and called "the operation room."

For the 500 skulls it averaged 11.3 *mm.* (20 to 0.3) right, and 11.8 *mm.* (25 to 0) left. The right was greater (up to a maximum of 9 *mm.*) in 159, the left (to 8) in 206, and there was equality 135 times. This equality was rather more common among medium crania, but was met in all types and with all dimensions from 1 *mm* to 17 *mm.* In the mesocephalic the extremes were less marked and the two sides almost identical in average—11.79 : 11.84 *mm.* In the larger groups of the long and short crania the averages for the two sides were almost identical, but a full millimetre less for the dolichocephalic—11.7 and 12 : 10.8 and 11 *mm.* Still more marked was this reversal of Koerner's finding in the extreme cases of each type: The 40 hyper-dolichocephalic (20 with index below .70) averaged 10.81 *mm* (20 to 0.2) and 11.45 *mm* (25–0) left, in contrast to 12.85 *mm* (16–4) right and 12.07 *mm* (16–0.2) left in the 40 extremely broad heads—15 with index .91 to .97. On this showing the right temporal of a very short head would seem safer than the left, since in but one instance did it show less than 6 *mm* between the operation-point and the sinus, which in all other specimens might be, as it often was, within a fraction of a millimetre of the point of attack. In not a few of the dangerous bones there is reason to hope that the large blood-vessel would have been discernible through the thin shell of bone which covered it.

The more superficial and anterior position of the right sinus, which is rather usual, is partly explained by its generally larger size. This long-known rule has often been exaggerated, perhaps because considered identical with that governing the size of the jugular fossa and foramen. This latter was larger on the right in 277 skulls and doubtfully so in 29 more; while the left was larger in 125, doubtfully so in 18 more, and equality existed in 51. Yet the jugular is made up of the inferior petrosal and the sigmoid sinuses and much of the blood of the latter vessels (all of it at times) may escape through the mastoid emissary to the external jugular. On the other hand, there is oftener discrepancy in the size of the foramen than of the sigmoid sulcus of each side, since the sulcus was larger on the right in 225, questionably so in 53 more, was larger on the left in 128, doubtfully so in 47 more, and was equal in 47.

Inadequate as the material here reported upon may be for determining the general laws governing the average position of the dangerous structures in relation to the operation of opening the mastoid, it serves to demonstrate several important facts. Safe or dangerous relations with maximum or minimum dimensions of the intervening structures, may be found on either side and in any type of skull, although at one or two points my findings must be supplemented by others in order to prove that the right temporal bone of the ultra-brachycephalic cranium may ever present the most dangerous configuration, which Dr. Koerner holds to be its characteristic. Hence it follows that the surgeon can in no case be absolved from proceding with his operation as though he were sure that the lateral sinus or the middle cerebral fossa lay so directly in his track that only the utmost care would avoid opening them unintentionally. The drill and trephine must be henceforth regarded as distinctly less safe than the chisel, as most operators of large experience have long held. The mastoid surface should be freely exposed and carefully scrutinized, since the lateral sinus may lie directly in the usual operating track, so superficial that it may be discerned through the thin bony covering. The upper posterior margin of the auditory meatus with its *spina* (which was lacking in but five among 200 temporals, each time on the right) constitutes the most reliable guide to the point of entry, since among more than 1100 temporals I have never found the middle cerebral fossa to extend lower than this, and the sigmoid sulcus almost never so far forward. The chiselling should begin as close as possible behind the *spina* and be carried cautiously inward, forward, and slightly upward, in those cases where the mastoid surface offers no special indications and the intention is to open the antrum. This cavity ought to be met at a depth of less than 20 *mm*. and deeper penetration is rarely safe, although my measurements would indicate that the facial canal and external semi-circular canal lie never less than 16 *mm* from a point 5 *mm* behind the *spina*.

# INVESTIGATIONS WITH TUNING-FORKS OF MIDDLE REGISTER IN OVER SIX HUNDRED CASES.

By HENRY A. ALDERTON, M.D., Brooklyn, N. Y.

WHEN the investigator attempts to sift the truth from the mass of literature upon the tests with tuning-forks, he is confronted with two contentions directly opposed to each other. One author declares, and is quoted by numerous others, that he "doubts whether these experiments in any way facilitate our diagnosis"; another "considers the tuning-fork examination the most exact of all examinations of hearing which are now practised." All, however, deprecate the expenditure of time necessary to the performance of the tests. It is questionable how valid is this last objection; an ophthalmologist does not deem the time spent in determining refraction as altogether lost. Certainly if a thing is worth doing at all, it is worth taking the time to do well.

With the idea of determining personally the value or lack of value of the tuning-fork in ear work, the writer undertook, at the beginning of his clinical work, to have every possible case tested throughout Hartmann's series, and now presents the results of experiments extending over 1891 and part of 1892. In the hurry of clinical work, it was not possible to test all cases, but those tested were not in any way chosen to bolster any preconceived notions or ideas. The tests were performed either by the writer or by capable assistants, and the tables below represent the averages obtained.

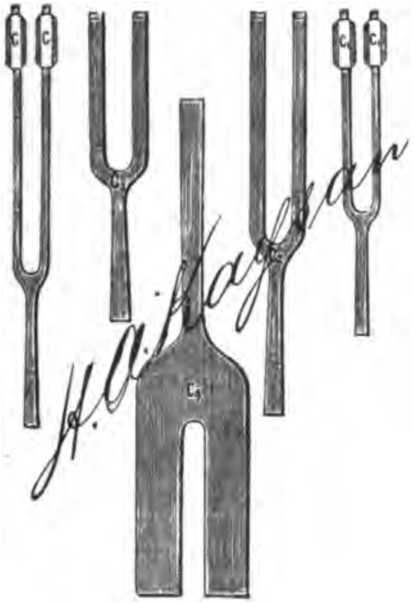
Through the kindness of Surgeon Edward Kershner, U. S. N., a large number of men belonging to the United States Marine Corps were detailed for examination. These men were purposely chosen to determine the normal reactions, because, having been subjected to a thorough physical and mental examination just previous to admission to the Corps, they were supposedly sound men of from eighteen to thirty years of age.

All possible precautions were taken to obtain accurate results, but these results must of necessity be of value only when compared with those obtained in investigating abnormal conditions with the same tuning-forks. In other words, each investigator must verify with his own instruments the normal reactions and use the results as a basis for comparison with those obtained in abnormal conditions. The reason for this lies in the fact that it is almost impossible to have any one series of forks correspond exactly with another, even when manufactured by the same man.

It will prove of value, perhaps, to briefly recall the normal reactions. All tuning-forks are perceived equally from the vertex, forehead, or teeth; as a precaution, always strike directly in front of the patient, so that neither ear gains the advantage of air conduction. All forks are heard longer by air conduction than by bone (Rinné). When one meatus is occluded artificially, the tuning-fork placed on the mid-skull is heard better by bone conduction in the occluded ear (Weber). With both ears normal the tuning-fork is heard equally well in both ears. Intensity of sound and duration do not correspond in the normal ear (Emerson). By air conduction, the tone also becomes audible anew for a few seconds after removal, when it has ceased to be heard. This also holds by bone conduction, if the meatus be occluded after the sound is no longer perceived (Bing). The average upper tone limit is about indicated by the mark 2.03 Galton (Bezold). This, however, varies very considerably with the make, so that anything above 2.05 may be considered fairly normal. The average lower tone limit is 17.04 v. (Bezold). Even still lower can be detected, but practically under 26 v. (Dench) is uncertain by AC. By BC, the writer has found that even with a fork vibrating 32–64 v. doubt often arises as to whether it is the sound or the vibration that is perceived, in comparing with AC.

It has been said that tuning-forks do not vibrate for so long a period after use as when new, but that the note remains unchanged (Emerson). The writer has not noticed any particular decrease in the duration of perception after three years of use of the same set, but has noticed that the tuning-forks have a tendency to give forth with more emphasis the overtones. It is best, except with the heaviest $C^{iv}$ fork, to establish the note by a flat stroke upon the bent knee, and the same result may be accomplished with the $C^{iv}$ fork by means of a stroke upon a thick piece of rubber. A fair stroke gives a very uniform reaction. In obtaining BC the stem of the tuning-fork should be firmly pressed upon the mastoid just over the situation of the mastoid antrum. Repeated testing in the same person diminishes the duration (Schwabach). By engaging the patient in conversation throughout the course of the test, this objection can be overcome to all intents and purposes.

Hartmann's series were employed, comprising forks $C=128$v., $C'=256$v., $C''=512$v., $C'''=1024$v., and $C^{iv}=2048$v., as imported from Germany by Mr. Kaysan, 34 Bond Street, Brooklyn, to whose kindness the writer is indebted for the appended cut. Hartmann has employed a fractional



method of graphic representation which seems to be too cumbersome and confusing. Each investigator quickly learns the normal responses of his own set of tuning-forks and then can easily use them for comparison. For communications they can be placed in juxtaposition with the abnormal, as a control.

The method of graphic representation in use by the writer is planned out by means of a stamp as below:

| | | | | | | |
|---|---|---|---|---|---|---|
| Rinné | | | | | | |
| Schwabach | AC | | | | | |
| | BC | | | | | |
| T.-F. | | C | $C'$ | $C''$ | $C'''$ | $C^{IV}$ |

For brevity AC=air conduction, BC=bone conduction. The Rinné being described as BC,=, or AC, according as in intensity BC is heard louder than, equal to, or worse than AC. In squares opposite Schwabach, the duration by air conduction, in seconds, is placed above, and that by bone conduction below, thus giving the duration Rinné as well at a glance. The lower line of squares is used to designate the tuning-fork whose reaction appears above. It must be apparent that but a moment is required to notice any deviation from the known normal, when presented after this plan.

Among the men offered, thirty-six absolutely normal ears were found, giving the following average. The watch was heard over 8 ft., the whisper 24 ft. + (all the distance obtainable).

Normal hearing—36 cases:

| | | | | | | |
|---|---|---|---|---|---|---|
| Rinné | | AC | AC | AC | AC | AC |
| Schwabach | AC | 25 | 15 | 33 | 32 | 22 |
| | BC | 13 | 7½ | 13 | 13 | 14 |
| T.-F. | | C | $C'$ | $C''$ | $C'''$ | $C^{IV}$ |

We thus see that the classical formula AC twice as long as BC (Emerson) holds fairly well, but the proportion for high notes is not much, if any, greater than for low notes —as contrast $C^{IV}$ with C. All the forks were heard AC > BC. Variations in duration were found to occur, but they were generally within the range of personal error, very seldom varying two or three seconds above or below the average for AC and still less for BC, and this was greatly lessened upon considering the whole ground.

Many cases of normal hearing distance for the watch and whisper were found, which, nevertheless, either subjectively or objectively, gave evidence of the existence of some abnormality in other directions.

Normal hearing distance, but giving symptoms — 52 cases:

| Rinné | | = | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 24 | 23⅓ | 33 | 30⅓ | 24 |
| | BC | 15 | 13⅓ | 15¾ | 15¾ | 15½ |
| T.-F. | | C | $C'$ | $C''$ | $C'''$ | $C^{IV}$ |

The most marked difference consists in the uniform increase in duration of BC, which is probably to be accounted for, as indicated by the C fork, by some interference with the motility of the sound-conducting apparatus, also, perhaps, to some hyperæsthesia of the nerve terminals produced by sympathetic congestion (?).

It was thought that the examination of cases of impacted cerumen both before and after removal, without the institution of any treatment in the interim, should prove interesting. This was carried out in twenty-seven cases, in all the hearing being restored practically to the normal by the simple removal of the plug.

Cerumen, with return to normal hearing after removal— 27 cases.

Before:

| Rinné | | BC | BC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 16½ | 18 | 22½ | 21½ | 17½ |
| | BC | 16 | 12¾ | 15½ | 16¾ | 11½ |
| T.-F. | | C | C′ | C″ | C″ | C$^{IV}$ |

After:

| Rinné | | = | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 23½ | 24¾ | 31¾ | 29 | 26 |
| | BC | 14½ | 12 | 13¾ | 13 | 15 |
| T.-F. | | C | C′ | C″ | C‴ | C$^{IV}$ |

In the first diagram the proportion between AC and BC is reduced throughout, the AC being lessened in duration and the BC being greatly increased, except for the C$^{IV}$ fork, which is what we would naturally expect, the sound-conducting apparatus being very little concerned in the transmission of very high notes (Bezold, Siebenmann). Intensity Rinné gives the forks C and C′ negative.

The immediate effect of removal is seen in that now no fork gives intensity—R and only the C fork gives =. The AC is increased in duration throughout and BC diminished, except for the C$^{IV}$ fork, where it is increased. This last point would seem to be an argument against the idea that labyrinthine tension would increase the duration of bone conduction, for here in a typical affection of the sound-conducting apparatus, we have increased duration for all forks except the highest, which should be the first affected, before removal, and after removal there is a fall in duration of all the forks except the highest, which immediately responds with increased duration, as though relieved from a strain.

***It would seem from this that increased labyrinthine tension would give decreased duration of bone-conduction, beginning with the high notes.***

The above findings are in opposition to the views of Eitelberg. "In the case of bilateral accumulation of cerumen, no change in the duration of BC was obtained after removal of the plugs," notwithstanding no other treatment was instituted, and confirms Schwabach's, "We see, therefore, that in the majority of cases of unquestionably peripheral ear disease in which — R resulted, not only was BC considerably prolonged above the normal, but also that ***in most cases the duration became almost or quite normal when normal conditions had been restored***" (the italics are the writer's). "For I found that the duration in disease of the sound-conducting apparatus is much longer than in health."

As of interest, for comparison, the average in twenty-nine cases of cerumen before and after removal follow, the hearing being improved but not to normal.

Cerumen—improved, but not to normal hearing after removal—29 cases.

Before:

| Rinné | | BC | BC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 13 | 14½ | 18 | 16¼ | 13 |
| | BC | 13 | 10¾ | 12¼ | 13¼ | 8½ |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

After:

| Rinné | | = | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 19 | 20½ | 26¼ | 22¾ | 20 |
| | BC | 12½ | 9¾ | 10½ | 12 | 11¼ |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

The foregoing twenty-nine cases were chosen without reference to the middle ear or labyrinth complications which existed. In a few the $C^{iv}$ fork was not heard at all before removal of cerumen, but was heard after, perhaps through air, though the meatus was artificially occluded for the high notes in determining bone conduction. In the two series, those giving normal, and those not, after removal, the intensity Rinné gives practically the same reactions, but the duration by AC before removal is more reduced throughout the scale in the complicated cases, just as by BC it is not increased, in fact the duration by BC is practically decreased as compared with the normal. In those not giving normal, after removal, we find the duration of AC increased, but not nearly to the normal, and the BC is diminished except in the $C^{iv}$ fork, ***thus again showing that an affection of the sound-conducting apparatus increases the duration for bone-conduction except for the highest notes.***

Forty cases of cerumen with great improvement in hearing after removal, but no tests, were next averaged.

Cerumen with great improvement in hearing after removal —40 cases.

Before:

| Rinné | | BC | BC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 12⅓ | 12⅓ | 17 | 15¼ | 14 |
| | BC | 13¾ | 11⅓ | 14⅓ | 14 | 9⅓ |
| T.-F. | | C | C′ | C″ | C‴ | $C^{iv}$ |

The duration by bone conduction is better than in those cases not giving normal, and not quite so good as in those giving normal after removal, so that the three conditions react to the order good, better, best.

Thirty-two cases of tubal obstruction due to adenoids, and twenty-one cases of tubal catarrh, giving immediate marked improvement upon treatment, are placed together for comparison, because the changes produced in the middle ear are of much the same character.

Tubal obstruction due to adenoids—32 cases:

| Rinné | | BC | BC | BC | BC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 12¾ | 13¾ | 20 | 17½ | 15½ |
| | BC | 16¼ | 14½ | 22¼ | 17¼ | 12½ |
| T.-F. | | C | C′ | C″ | C‴ | $C^{IV}$ |

Tubal catarrh, giving immediate marked improvement—21 cases:

| Rinné | | BC | BC | = | = | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 16¾ | 15½ | 22 | 19¾ | 17¾ |
| | BC | 14 | 13¾ | 19¾ | 15 | 10¼ |
| T.-F. | | C | C′ | C″ | C‴ | $C^{IV}$ |

Two factors enter into the greater duration of bone conduction throughout and the ascending or climbing up the scale of the intensity Rinné BC>AC to the high notes in adenoids as contrasted with tubal catarrh; one is the greater youthfulness of the patient, and the other, the greater strain or tension put upon the conducting apparatus, because of the longer duration of adenoids. In both of these typical obstructors of the sound-conducting apparatus, BC is greatly prolonged, especially for the lower C forks.

In an examination of fourteen cases of otitis media subacuta, the following averages were obtained. No special choice of cases was made, it being impossible always to see the cases after recovery in order to exclude any complication:

| Rinné | | BC | = | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 16 | 14½ | 18 | 14½ | 15 |
| | BC | 13 | 11½ | 12¼ | 13½ | 10¼ |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

Bezold's statement that in otitis media subacuta an abbreviated positive result (by duration) is obtained, is therefore confirmed, but were intensity employed instead, the C and C′ forks would give negative Rinné. The duration of bone conduction is slightly reduced, though not sufficiently to indicate any appreciable labyrinthine lesion.

It is held almost universally that otitis media purulenta acuta is simply a more intense inflammation than otitis media catarrhalis acuta, and with this the writer agrees, and hence groups their tests together.

Otitis media catarrhal. acuta—9 cases:

| Rinné | | BC | BC | BC | BC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 10¾ | 11 | 15¾ | 11¼ | 14¾ |
| | BC | 15¼ | 11¾ | 13½ | 12¾ | 9¾ |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

Otitis media purulenta acuta—51 cases:

| Rinné | | BC | BC | BC | = | = |
|---|---|---|---|---|---|---|
| Schwabach | AC | 7¾ | 9 | 12½ | 12 | 11¾ |
| | BC | 14¼ | 12 | 16½ | 14½ | 10 |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

Otitis media purulenta recurrens—18 cases:

| Rinné | | BC | BC | BC | BC | = |
|---|---|---|---|---|---|---|
| Schwabach | AC | 8 | 8¼ | 13¼ | 14¾ | 13 |
| | BC | 13¾ | 11 | 17 | 16 | 12 |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

The duration of air conduction is practically about the same in all three, except that the greater resistance existing in the sound-conducting apparatus is evidenced by the lessened duration for the lower forks in otitis media purulenta acuta and recurrens. The intensity negative Rinné climbs farther up the scale in otitis media purulenta acuta and still more in otitis media purulenta recurrens. The duration of bone conduction becomes greater as the resistance becomes greater.

In studying these diagrams it is proven that Bezold's statement that in acute middle ear inflammations we obtain, despite well-marked diminution of the hearing, an abbreviated positive Rinné, does not hold as a rule. The increased duration of bone conduction in otitis media purulenta recurrens over otitis media purulenta acuta, the intensity of the inflammation being presumably much the same, if not greater in otitis media purulenta acuta, is due in all probability to the fact that in otitis media purulenta recurrens, because of the previous attacks, there is more infiltration and cicatrization and therefore more resistance to sound conduction.

One hundred and nineteen cases of otitis media purulenta chronica were divided into those with moderate impairment of hearing and those with great impairment of hearing.

Otitis media purulenta chronica with moderate impairment of hearing-whisper heard over ten feet—53 cases:

| Rinné | | BC | BC | = | = | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 10¾ | 12⅓ | 16 | 17⅓ | 16¼ |
| | BC | 15 | 16¼ | 16¼ | 15⅓ | 13 |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

Otitis media purulenta chronica with great impairment of hearing-whisper heard under 10 feet—66 cases:

| Rinné | | BC | BC | BC | BC | = |
|---|---|---|---|---|---|---|
| Schwabach | AC | 7¾ | 9 | 12⅓ | 12 | 11¾ |
| | BC | 14¼ | 12 | 16⅓ | 14⅓ | 10 |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

In those with great impairment of hearing, the intensity negative Rinné has climbed farther up the scale, and the duration of bone conduction is practically uniformly reduced throughout, showing an evident, though slight, beginning involvement of the labyrinth, as from the previous experiments the duration, if the labyrinth were intact, should be, if anything, slightly more than in the first. Practically we see that Barr was right. "The striking fact as to the almost invariable preponderance of BC (by Rinné) in otitis media purulenta chronica, proves how seldom the labyrinthine structures are involved in these cases," but still in cases of long duration there is a slight decrease in duration of BC, and though "also increased perception by BC" above the normal, as a rule, the increase is less than it should be for the amount of obstruction present of the sound-conducting apparatus, and hence we must infer a beginning impairment of nerve acuteness. One is struck by the fact that, notwithstanding the great disturbance in the tension of the sound-conducting apparatus, as must surely be present in these latter cases, there is apparently no corresponding influence upon nerve response.

Simply as curiosities and, because of their number, with no intention to draw any comparison, two classes of Shrapnell's cases are appended.

Without involvement of the membrana vibrans—6 cases:

| Rinné | | BC | BC | BC | BC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 7½ | 10 | 13½ | 13¼ | 12 |
| | BC | 14 | 9½ | 15½ | 14 | 10½ |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

With involvement of the membrana vibrans—4 cases:

| Rinné | | BC | BC | BC | BC | = |
|---|---|---|---|---|---|---|
| Schwabach | AC | 8¾ | 6¾ | 17 | 22 | 15 |
| | BC | 15 | 9¾ | 17¼ | 16¼ | 10½ |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

Under the name of otitis media purulenta residuosa are classed those cicatricial conditions of the tympanum the result of a healed otitis media purulenta. Seventy-four cases were tested and were divided into three classes—those with slight, moderate, and great impairment of hearing.

Otitis media purulenta residuosa with slight impairment of hearing—19 cases. Watch heard 2 ft., whisper 15 ft. +:

| Rinné | | BC | BC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 17 | 17 | 23 | 21 | 17¾ |
| | BC | 13½ | 11 | 14¼ | 13 | 11½ |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

Otitis media purulenta residuosa with moderate impairment of hearing—30 cases. Watch heard under two ft., whisper 8–16 ft. +:

| Rinné | | BC | BC | = | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 12¼ | 13¾ | 18½ | 18 | 16½ |
| | BC | 13 | 10⅓ | 14 | 13 | 11 |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

Otitis media purulenta residuosa with great impairment of hearing—25 cases. Watch heard under 9 in., whisper under 8 ft.:

| Rinné | | BC | BC | BC | BC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 8½ | 10 | 12¼ | 12 | 11½ |
| | BC | 14 | 11¼ | 15⅓ | 11½ | 8¼ |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

There is virtually no difference in the duration of bone conduction in those cases of slight and moderate hardness of hearing, but the greater obstruction to hearing is indicated in the latter by the diminished duration of air conduction and the climbing up the scale of intensity BC > AC. This ascending tendency is still further noticeable in those with great impairment of hearing, but with this there is diminished duration of bone conduction for the C‴ and $C^{IV}$ forks, though the lower forks have increased duration of bone conduction. This would seem to point to the labyrinth as somewhat at fault, probably because of the greater and perhaps more prolonged strain that it was subjected to in a middle-ear inflammation of sufficient intensity to produce such an amount of deafness after healing. This would seem to emphasize Dench's contention that because of the blood supply the lower turn of the cochlea (the seat of perception for the highest notes) is that first affected in labyrinthine involvement due to middle-ear inflammation. If the duration of BC in these cases be compared with that obtained in the normal, it will at once be seen that there is no real increase, thus conflicting with Bezold, who found in remains of otitis media purulenta the BC considerably intensified and lengthened.

In order to accentuate the difference in the reactions between real affections of the sound-conducting and of the sound-perceiving apparatus, the next diagrams given will be those of evident nerve disease, without any distinction being made as to peripheral, trunk, or central affections.

Nerve with great impairment of hearing—7 cases. Whisper heard under 2 ft:

| Rinné | | AC | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 17¼ | 15¾ | 19½ | 11 | 10 |
| | BC | 8⅓ | 7¾ | 3¾ | 3¾ | 1¼ |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

Nerve with considerable impairment of hearing—10 cases. Whisper heard 2 to 10 ft.:

| Rinné | | AC | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 12¾ | 16¼ | 20 | 17⅓ | 10 |
| | BC | 8¾ | 6½ | 6⅓ | 3⅓ | 1⅓ |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

Nerve with moderate amount of hearing—4 cases. Whisper 10 ft. +:

| Rinné | | AC | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 22 | 23⅓ | 26¾ | 22⅓ | 17¼ |
| | BC | 11¼ | 7⅓ | 7¼ | 7 | 5⅓ |
| T.-F. | | C | C′ | C″ | C‴ | C^IV^ |

As reason would dictate, the duration of air conduction progressively improves as the hearing is better, when the field as a whole is taken into consideration. This also occurs with bone conduction, but there is more irregularity in this. AC > BC exists throughout both by duration and intensity. Gaps in the series were noticed only in the considerably and greatly hard of hearing cases (in two out of seven of the latter, and in one out of ten of the former). In those with great hardness of hearing, all but one case showed one or more of the higher forks not heard at all by BC, and of these, four could not hear the C″, three the C‴, and five the $C^{IV}$ fork; two could not hear any fork above C′. AC was present throughout the series in all the cases. In those with considerable hardness of hearing, seven could not hear one or more of the higher forks by BC; one could not hear any fork above C′. AC was present throughout the series in all the cases. In those with moderate hardness of hearing, all forks were heard by BC, but the duration was much less than in the normal.

As Schwartze says, retained BC only proves the trunk of the auditory nerve and its centre to be sound, but does not necessarily imply a healthy condition of the labyrinth, so does this explain the cases of more or less destruction of the cochlea with retention of BC and of a certain degree of hearing. Barr found in labyrinthine diseases, AC>BC in 80%, and in one hundred deaf boiler-makers, only 10% gave BC>AC. In the above cases both intensity and duration of AC was greater than BC throughout the series wherever heard.

These same cases were observed long enough to again class them under three divisions, as to which were not improved, which were slightly improved, and which were markedly improved through treatment, the tests being the same as those above, simply rearranged.

Nerve disease with no real improvement—16 cases:

| Rinné | | AC | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 16¾ | 17¾ | 21 | 15¼ | 10¼ |
| | BC | 10 | 7½ | 6 | 4¼ | 1¾ |
| T.-F. | | C | $C'$ | $C''$ | $C'''$ | $C^{IV}$ |

Nerve disease with slight improvement—3 cases:

| Rinné | | AC | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 14¾ | 18¼ | 24¼ | 22 | 17 |
| | BC | 6¼ | 6¼ | 4 | 4¼ | 5 |
| T.-F. | | C | $C'$ | $C''$ | $C'''$ | $C^{IV}$ |

Nerve disease with marked improvement—2 cases:

| Rinné | | AC | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 12½ | 13 | 18 | 16½ | 12½ |
| | BC | 7½ | 5½ | 5½ | 4 | 2 |
| T.-F. | | C | $C'$ | $C''$ | $C'''$ | $C^{IV}$ |

Thus sixteen cases in twenty-one were not improved at all, notwithstanding that treatment was experimently directed to both the middle and internal ear. Also these tests apparently give no aid as to prognosis, the duration of BC following no rule.

Fifty-six cases of otitis media catarrhalis chronica were examined: of these there were:

Otitis media catarrhalis chronica with great impairment of hearing—25 cases:

| Rinné | | BC | BC | BC | BC | = |
|---|---|---|---|---|---|---|
| Schwabach | AC | 5¾ | 5¾ | 10½ | 11 | 10¾ |
| | BC | 15 | 11 | 16 | 13¼ | 9½ |
| T.-F. | | C | C | C' | C | $C^{IV}$ |

Otitis media catarrhalis chronica with considerable impairment of hearing—19 cases:

| Rinné | | BC | BC | BC | = | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 7¾ | 10½ | 12¾ | 12¾ | 13¾ |
| | BC | 16 | 13½ | 17¼ | 13½ | 9 |
| T.-F. | | C | C' | C'' | C | $C^{IV}$ |

Otitis media catarrhalis chronica with moderate impairment of hearing—12 cases:

| Rinné | | BC | BC | = | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 9 | 11 | 15¾ | 18 | 16 |
| | BC | 13 | 10¼ | 14 | 12¾ | 10 |
| T.-F. | | C | C' | C'' | C''' | $C^{IV}$ |

As the hearing is more involved we find the intensity BC>AC ascending the scale. The duration of air conduction is mainly affected in the lower forks. In the cases with moderate impairment the duration of BC approaches more nearly to the normal, whereas in the others the duration is increased, in the cases with great impairment falling slightly as compared with the considerably impaired cases, thus hinting at the beginning labyrinth sequela. When the reactions above are compared with those obtained in self-evident affections of the external or middle ear (as cerumen, otitis media purulenta, etc.) no one would hesitate to brand them as being produced by a middle-ear inflammation with little or no labyrinthine involvement. Bezold's declaration that in otitis media catarrhalis chronica the lower forks are heard longer than the normal, the upper about normal by BC, is confirmed. Among these fifty-six cases, six were found in which +R resulted for a certain fork and —R for the next higher, both by duration and intensity, hence proving exceptions to Bezold's inference that "such a possibility seems physically excluded." The writer was also able to confirm Bezold's statement that the duration of AC is shortened in otitis media catarrhalis chronica to complete absence of perception of deep and moderately high notes, with the proviso—or to great diminution. In no case was there a gap in the series.

The above cases of otitis media catarrhalis chronica were observed sufficiently long to divide them again according to the improvement received through treatment, the tests being the same rearranged.

Otitis media catarrhalis chronica not improved—11 cases:

| Rinné | | BC | BC | BC | BC | = |
|---|---|---|---|---|---|---|
| Schwabach | AC | 7¾ | 10½ | 13¾ | 15¾ | 12¼ |
| | BC | 16 | 12¾ | 17 | 16 | 11 |
| T.-F. | | C | C′ | C″ | C‴ | $C^{IV}$ |

Otitis media catarrhalis chronica slightly improved—8 cases:

| Rinné | | BC | BC | BC | = | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 5¾ | 6½ | 10¼ | 12¼ | 11¾ |
| | BC | 14½ | 13¼ | 15¾ | 11 | 7½ |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

Otitis media catarrhalis chronica moderately improved—11 cases:

| Rinné | | BC | BC | BC | = | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 7½ | 9½ | 12¼ | 14¾ | 15 |
| | BC | 14¾ | 11 | 14 | 12¼ | 9¾ |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

Otitis media catarrhalis chronica considerably improved—6 cases:

| Rinné | | BC | BC | BC | BC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 8 | 9¼ | 15 | 13¾ | 13¾ |
| | BC | 16 | 12¼ | 15½ | 13½ | 8 |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

Otitis media catarrhalis chronica greatly improved—18 cases:

| Rinné | | BC | BC | BC | BC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 6¾ | 6¾ | 11½ | 11 | 12 |
| | BC | 14 | 10½ | 17 | 13 | 9½ |
| T.-F. | | C | C′ | C″ | C‴ | C<sup>IV</sup> |

Thirty-seven cases in fifty-six were either moderately, considerably, or greatly improved; eight were slightly, and only eleven were not improved; 80 per cent. improved as against only 31 per cent. of nerve cases. After carefully reviewing the above tables one is compelled to the conclusion that no reliable help as to prognosis can be obtained in otitis media catarrhalis chronica by means of either Schwabach's or Rinné's test, unless it be that whenever intensity Rinné BC > AC or BC = AC reaches the $C^{iv}$ fork, treatment is almost hopeless. Further work along the same line, already undertaken, may, through a larger experience, give the same or different result.

Dr. Roosa, in a written communication, defines presbykousis, a term of which he is the originator, as an atrophic condition of the tympanic muscles coincident with a similar lesion of the acoustic terminal filaments, and believes "that it is a common, if not universal, condition of things in people of more than fifty years of age." As, from observation, the writer believes that such a condition does truly exist, *i.e.*, a lack of function in the middle ear and nerve apparatus in elderly people, the tests taken in such cases are next presented as being without doubt representative of a combination of lesions of the nerve and middle ear. These cases are usually susceptible of immediate improvement through treatment directed to the middle ear, even without any attention to the nerve structures. The reactions were obtained from cases that were improved by treatment.

Presbykousis—11 cases:

| Rinné | | = | AC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 12¾ | 11 | 15 | 12½ | 11¼ |
| | BC | 8¼ | 6¼ | 5 | 5 | 4¼ |
| T.-F. | | C | C' | C'' | C''' | $C^{IV}$ |

By AC the tuning-forks were heard throughout, except in one case in which the two lower forks were not heard. By BC two cases did not hear the C' fork, five the C″, six the

C‴, two the C$^{iv}$; two cases heard no fork above C; four cases showed gaps for either C″ or C‴, or both. It is believed that C$^{iv}$ fork may have been heard through air conduction notwithstanding precautionary closure of the meatus with the finger. Emerson's statement was found to apply that "BC may be entirely lost and yet AC continue to a limited extent." His statement that "if the proportion between BC and AC remains the same, and the hearing power much lessened, it is probably an indication of disease of the internal ear" was found to apply as well to "mixed" cases.

Thirty-five cases of evident otitis media et interna ("mixed cases"—Roosa) were examined with the following averages.

Mixed cases, with great impairment of hearing. Whisper heard under 2 feet—17 cases:

| Rinné | BC | BC | = | AC | AC |
|---|---|---|---|---|---|
| Schwabach AC | 8⅛ | 7⅛ | 9⅛ | 7¾ | 7¾ |
| Schwabach BC | 10¾ | 9¼ | 7 | 5¼ | 2¼ |
| T.-F. | C | C′ | C″ | C‴ | C$^{IV}$ |

Mixed cases, with considerable impairment of hearing. Whisper heard 2–10 feet—13 cases:

| Rinné | BC | BC | AC | AC | AC |
|---|---|---|---|---|---|
| Schwabach AB | 8¾ | 9 | 12 | 10¼ | 9¼ |
| Schwabach BC | 10⅛ | 8 | 8¼ | 6 | 4½ |
| T.-F. | C | C′ | C″ | C‴ | C$^{IV}$ |

Mixed cases, with moderate impairment of hearing. Whisper heard 10 feet—5 cases:

| | | | | | | |
|---|---|---|---|---|---|---|
| Rinné | | = | = | AC | AC | AC |
| Schwabach | AC | 16⅕ | 19⅕ | 21⅕ | 24 | 18 |
| | BC | 8 | 7⅕ | 7 | 7 | 7 |
| T.-F. | | C | C′ | C″ | C‴ | C^IV |

In the first group four cases could not hear the C and C′ forks by AC, two the C″ fork, two the C‴ fork; all heard the C^IV fork. Gaps existed in two cases, the C″ and C‴ forks being the sufferers. By BC, C and C′ forks were heard in all, two did not hear C″, three C‴, and eight C^IV. There were no gaps by BC. In the second group, the C fork was not heard by AC in one case, the other forks being heard throughout. By BC, one case did not hear C‴, and two C^IV. There were no gaps by either AC or BC. In the third group, all forks were heard throughout by both AC and BC.

A study of the tables and explanatory remarks will make it apparent that the lower forks were more constantly heard by BC and less constantly by AC, and the higher forks more constantly by AC and less constantly by BC, demonstrating the double nature of the lesion. For claiming in these cases labyrinthine involvement, we have the authority of Emerson, Bezold, Cholewa, Politzer, and others. The above reactions show how important it is that thorough tests should be applied before resorting to ossiculectomy, for it is manifest that when the nerve is involved to a considerable or great extent, but little can be hoped from the operation.

These reactions were again apportioned according to the improvement secured by treatment.

Mixed cases with no real improvement—4 cases:

| Rinné | | BC | BC | = | = | AC |
|---|---|---|---|---|---|---|
| Schwabach | AB | 9¼ | 10 | 11¾ | 16 | 10 |
| | BC | 12¼ | 10¼ | 12¾ | 8¾ | 4¾ |
| T.-F. | | C | C′ | C″ | C‴ | $C^{IV}$ |

Mixed cases with slight improvement—13 cases:

| Rinné | | BC | BC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 10¼ | 10 | 12½ | 10½ | 9 |
| | BC | 9 | 7¼ | 6¼ | 4½ | 3½ |
| T.-F. | | .C | C′ | C″ | C‴ | $C^{IV}$ |

Mixed cases with moderate improvement—5 cases:

| Rinné | | = | BC | = | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 14 | 14 | 16 | 14 | 12 |
| | BC | 11 | 9½ | 7 | 6 | 5 |
| T.-F. | | C | C′ | C″ | C‴ | $C^{IV}$ |

Mixed cases with considerable improvement—14 cases:

| Rinné | | BC | BC | AC | AC | AC |
|---|---|---|---|---|---|---|
| Schwabach | AC | 8½ | 8½ | 11 | 9¼ | 9½ |
| | BC | 10½ | 9 | 7½ | 5¾ | 3 |
| T.-F. | | C | C′ | C″ | C‴ | $C^{IV}$ |

About 52 % were more than slightly improved, while in otitis media catarrhalis chronica over 62 % were correspondingly improved, and in nerve less than 10 %.

In the first group, AC was present throughout, and by BC only $C^{IV}$ was not heard by one case. In the second group, two cases did not hear C by AC, one $C'$; by BC two did not hear $C''$, the same two did not hear $C'''$, the same two and three more did not hear $C^{IV}$. In the third group, by AC all forks were heard except for a gap of $C'''$ in one case; by BC one case did not hear either $C'''$ or $C^{IV}$; the other forks were heard throughout. In the fourth group, by AC three did not hear C or $C'$, two $C''$, one $C'''$; by BC one did not hear $C'''$, four $C^{IV}$. With mixed cases, therefore, as with otitis media catarrhalis chronica, no aid is to be expected in prognosis through the medium of the tuning-fork tests. The tests simply show the amount of obstruction to hearing, and whether this is slight or grave, the feasibility of the removal of the disability depends upon the removability of the cause or causes.

## CONCLUSIONS.

I. Intensity or duration Rinné $BC > AC$ or $BC = AC$ always indicates some middle-ear disease, either alone or as a complication.

II. In any peripheral disease sufficient to produce any degree of deafness, intensity Rinné $BC > AC$ or $BC = AC$ will be found to exist if a low enough fork be used in the testing, providing the internal ear is normal or nearly so.

III. The duration of BC is increased over the normal in affections of the sound-conducting apparatus, except for the highest notes ($C^{IV}$ and over); the explanation of this exception existing in the fact that the sound-conducting apparatus is not concerned in the transmission of high notes (Bezold, Siebenmann).

IV. In affections of the sound-conducting apparatus, sounds of a low pitch are poorly heard by AC, while high-pitched sounds are relatively well perceived.

V. The higher up the scale of forks the intensity negative Rinné travels, the greater the degree of sound obstruction existing in the sound-conducting apparatus, as a rule.

VI. The writer believes the prolonged duration of BC in affections of the sound-conducting apparatus to be due to a combination of the resonant effect of occlusion, to the shutting out of outside conflicting sounds, and perhaps also to disturbed labyrinthine tension, but does not believe that the hyperæsthesia theory as advanced by Steinbuegge is at all tenable, except at the very inception of an acute inflammation. If increased tension be a cause, it should prolong the duration for high forks correspondingly with that for the low, as it does not seem reasonable to have anything other than a uniform disturbance throughout the scale in the duration of BC, from variations in tension of the labyrinthine fluid. Any irregular reactions in bone conduction should, it seems to the writer, be attributed to other pathological changes either in the labyrinth, the nerve trunk, or centre.

VII. Any profound or prolonged middle-ear affection ultimately affects the labyrinth secondarily.

VIII. If the duration of BC be curtailed to any extent, as compared with the normal or known abnormal, there is some internal ear disease, either alone or as a complication. The writer would lay stress upon the fact that in order to determine degrees of nerve deafness, testing only with the series of tuning-forks of middle register will almost invariably indicate the seat of the trouble by a diminished duration of BC for the $C^{iv}$ fork, which is also, but progressively less noticeably, present in those forks immediately lower, only excepting those cases giving gaps. This is confirmed by Gradenigo, who found diminution of hearing in lesion of the nerve trunk demonstrated by examination with forks of middle register.

IX. The intensity Rinné (comparative initial loudness of AC and BC) and Schwabach (absolute duration) tests when combined furnish much more valuable assistance than either the duration Rinné (comparative duration of AC and BC), or Weber in the diagnosis of ear troubles.

X. It is not necessary, when the entire series of tuning-forks is used, to put any arbitrary whisper limitation upon the reactions in determining the diagnosis.

XI. It is possible to have a higher fork heard BC > AC or BC = AC, either by intensity or duration, when the next lower fork is heard AC > BC.

XII. The tuning-fork tests give no certain help in prognosis as to the degree of improvement that may be hoped for, except that when in affections of the sound-conducting apparatus intensity negative Rinné has climbed up to the $C^{iv}$ fork, not much, as a rule, can be hoped for through treatment.

XIII. Duration of BC becomes almost or quite normal, when normal conditions are restored.

XIV. The forks absolutely necessary to a diagnosis, where time is a consideration, are the $C'$ fork, 32 — 64v., or Dench's 26 — 64v. clamped fork, to determine intensity Rinné and the $C'''$ fork, 1024v., to determine absolute BC. The two combined give a pretty true idea of the ordinary conditions and the necessities.

XV. The writer desires to insist that in the thorough canvassing of the whole series of tuning-forks lies the great advantage that where one may easily be mislead by any one fork, it is almost impossible not to gain valuable diagnostic points when the reactions throughout the scale are compared with the normal and known abnormal.

XVI. There are apparent exceptions to all the above conclusions, and it behooves the observer not to conclude therefore that the generalizations are of no value, but rather to inquire carefully into the exceptions with the hope of ultimately strengthening our knowledge of a difficult subject.

The writer has purposely in this article given the results only through the middle register, and does not wish even these to be considered to represent his crystallized opinion, as he is still pursuing experiments along the same line. They are only given out as a matter of observation. Investigations in regard to the upper and lower tone limit, Weber, and so forth, are reserved for a future communication, as is also further work in the direction of prognostic help.

# THREE FATAL CASES OF OTITIC INTRA-CRANIAL COMPLICATIONS.

By Prof. S. MOOS, Heidelberg.

Translated by Geo. L. Morgenthau, Chicago, Ill.

THE more numerous the reports of otitic intracranial complications the more certain becomes the interpretation of the symptoms, the diagnosis, and the treatment in a given case. From this point of view, I publish the following three cases which were observed at a time when operative brain surgery was in its infancy, at least in Germany.

Case 1.—Notable case of otitic thrombosis of lateral sinus. Death from pyo-septicemia after perforation of mastoid process.

Patient, lawyer, æt. fifty-four. Father and two brothers died of tuberculosis. Began treatment September 26, 1890. He maintains that, as far as he remembers, he has never been seriously ill (!) excepting a discharge from the left ear, dating from earliest childhood, for which he never consulted a physician. Aural discharge is said to have grown worse since September 17. On this day, it being hot weather, he took a walk in the woods, without a coat, in shirt sleeves. He claims to have caught cold on this occasion, to have felt uncomfortable afterwards, but without chills or fever. For the first time since the ear trouble began, he has pains in and behind the left ear since 3 days ; they persist to-day, although not to a great extent nor continuously ; without headache, or tinnitis, and without giddiness or nausea ; appetite somewhat diminished ; no constipation.

Present condition. Diffuse redness over left mastoid, slight enlargement, but little sensitive on pressure and percussion ; in middle of posterior wall of bony meatus, small granulations; drum-membrane entirely gone; labyrinthine mucous membrane appears thickened, after the layer of pus is removed by syringing, the fluid escaping by Eustachian tube. Hearing: voice understood at ¼ metre, but also when both ears are plugged; watch and acoumeter, *nil*, by air and bone conduction. Tuning-fork of 8 octaves; patient states that, on the left side, he perceives only g 5, and by bone conduction only C (128 vibrations). Temperature, *normal*; pulse, 108.

*September* 27, 9 A.M.—Mastoid operated on with chisel. It appears sclerotic throughout. In process itself no trace of pus. Only on reaching antrum, caseous masses which flow abundantly from external meatus on irrigation. Injected fluid escapes partly by tube. Dressing of iodoform gauze. 2 stitches.

4.30 P.M.—Temperature 38.5; nearly uninterrupted sleep since operation.

9 P.M.—Temperature, 38.0.

28, 9 A.M.—38.0. Pulse, 84; very good night.

29, 9 A.M.—38.4. Pulse, 90; change of dressing; stitches taken out; but few hardened masses removed by irrigation; 6.30 P.M. and 8.30 P.M., 37.9.

During night 29—30 September great pain in region of left tragus. 30, 9 A.M.—37.6. Large abscess of tragus opens spontaneously. Now entirely free from pain. Feels well. 4.30 P.M. —Temperature, 37.1. 3.30. P.M.—36.5.

*October* 1—8 A.M. Temperature, 37.2; pulse, 90. Vomits breakfast. Profuse discharge from tragus abscess. Change of dressings; irrigation; escapes mostly by tube. Margins of wound gape, also where stitched. Iodoform gauze dressing. 3 P.M. and 6.30 P.M.—Temperature, 38.5; pulse, 100; very thirsty. Very quiet, good sleep during night October 1—2. Nevertheless, great lassitude in the morning. No appetite; temperature, 38.8; pulse, 100. Wound is very much softened, gangrenous. Iodoform gauze dressing. Condition unchanged till 5 P.M. Temperature, 39.5; pulse, 104. 30, P.M.—Temperature, 38.5. Night October 2—3, sleep again quiet and good. $^{3}/_{x}$. 8 A.M., temperature, 37.8; pulse, 108. Wound and dressing as lately. 9.30 A.M.; temperature, 38.8. Tongue much coated; complete loss of appetite; constipation (saline waters repeatedly given without result); much albumen in urine (persists till end). Great prostration. Champagne. 6 P.M.—Temperature, 37.8; pulse, 120 ; respiration, 54. Over whole lung, especially at upper two thirds, numerous fine and coarse râles ; more fine râles with tympanitic resonance in upper two thirds ; in lower third resonance is dull. After rectal injection copious passage. Infus. Ipecæ.

*October* 4, 8 A.M.—Rather quiet night ; temperature, 39.9 ; pulse, 144 ; respiration, 48. Lungs same as yesterday. Somnolent. Cannot be roused by calling. Otherwise same condition. 4 P.M.—38.5. Complete loss of consciousness. Stammers meaningless words. Only champagne is taken. From 4 P.M. body began to swell. Death, 9.30 P.M. Soon afterwards numerous pctechiæ on hands.

Autopsy by Professor Ernst :

Thrombic masses in transverse and semicircular sinus to jugular foramen ; inferior petrosal sinus with beginning softening of thrombi. Dirty, brownish, cheesy appearance of thrombi. Hemorrhagic fibrinous pachymeningitis (layer of thin, discolored fibrin) in post. cranial cavity (on post. wall of petrous bone). Superior petrosal sinus is impervious just before entering transverse sinus ; then sinus appears suddenly well filled, and continues so over petrous bone. The blood cannot be squeezed towards transverse sinus.

Old opacities and thickening of pia mater of convexity (in addition, numerous Pacchionian granulations). Anemia of brain. Multiple adhesions between dura mater and skull-cap, and dura and pia mater.

Atheroma of aorta and coronary arteries.

Old pleuritic adhesions on both sides; on the left, more extensive and firmer (without obliteration of entire pleural cavity). Multiple purulent, round, and wedge-shaped pneumonic foci; on the left, more at periphery; on the right, quite numerous also in central part of lung. Granular atrophy (chronic interstitial hepatitis) of liver.

Parenchymatous nephritis.

Organs in far advanced disintegration, with gas bubbles.

Stomach much dilated. Swelling of spleen. Obesity.

## EXAMINATION OF PETROUS BONE.

About the middle of the posterior wall of the bony meatus several small granulations springing from circumscribed carious spot. Antrum without caseous masses; lining thick, bluish-red (post-mortem phenomenon?). Mucous membrane of labyrinthine wall of similar appearance. Drum-membrane and first two ossicles missing. Tympanic opening of tube very wide. Nowhere signs of caries which could have communicated the sinus thrombosis. Labyrinth not examined.

This case is notable in many respects:

1. On account of rapid onset of fever—8 hour following perforation of mastoid, not having been present before.
2. On account of the peculiar course of the fever, differing nearly entirely from the course of fever in infection from sinus thrombosis. Never a chill, nor, still less, rigor; and the greatest variation during the day was only 2°, even only 1½° on the final day.
3. On account of the disproportion between the comparatively low temperature and the great extension of the secondary affections in lung and kidneys.
4. On account of the absence of carious portions which might transmit the local affection to intra-cranial parts.
5. On account of the rapidly fatal course.
6. On account of the abscess of the tragus, which was evidently metastatic.

In forming the diagnosis, I did not recognize the intercranial mischief; I thought of miliary tuberculosis, being led to this, mainly, by the tubercular diathesis, the quickly appearing extensive pulmonary affections, as well as the albuminuria and the absence of clinical phenomena of pyemic fever.

The rapid onset of the fever after operation suggests that, considering the absence (as shown post-mortem) of a transmitting caries, perforation of the mastoid—rendered more difficult by the osteo-sclerosis—may have been the immediate cause of the fatal lateral sinus thrombosis; that, therefore, the dangers of the chisel operation are increased under certain conditions, in a similar manner as Galli, in his essay "On surgical operations from a clinician's point of view," expressed fears in regard to the brain. Probably, alcoholism was a predisposing factor in the production of the pyo-septicemia which appeared shortly after the operation and ran such a rapid course. In order to avoid errors of diagnosis in similar cases, bacteriological examinations of either the blood or the secretions, or both, might be advisable.

Birch-Hirchfield,[1] in 1893, drew attention to the presence of bacteria in the blood of pyemics. Gariré,[2] Von Eiselsberg,[3] and Korangi-Ferray,[4] were lately successful in demonstrating, positively, pus cocci.

It is known that we have quite a number of observations and proofs of the presence of cocci in the excretions of pyemics in urine,[5] in sweat,[6] in conjunctival secretions,[7] in exudations into joints,[8] and in the milk[9] of women suffering from puerperal sepsis.

CASE II.—This case deserves notice because of the coexistence of most of the otitic complications (facial paralysis, thrombo-phlebitis, cerebral abscess, and meningitis) as well as especially because of the possibility (demonstrated by the autopsy) of combining—if an operation had been undertaken—operative treatment of sinus thrombosis and of cerebellar abscess communicating with the sinus, with perforation of mastoid.

It is a case[10] of chronic left purulent otitis media; repeated exacerbations. Cholesteatoma in drum-cavity and mastoid ; caries and polypi on its anterior wall, and caries on the anterior wall of the external auditory meatus. Facial paralysis. Most violent headaches. Repeated rigors. Death from paralysis of respiratory centres.

S. K., laborer, æt. thirty-seven. Received June 28, 1888.

Since infancy discharge from the left ear, with painful exacerbation of this disease and facial paralysis in 1885 while suffering from pulmonary catarrh, which kept him from work for six weeks. Mother died of phthisis; a sister of stomach disease; another of an acute abdominal trouble, after having undergone an operation for mastoid cholesteatoma in the aural clinic some years before. Five of his surviving brothers and sisters are healthy. Without evident cause, the aural disease which had persisted since 1885 but without pains, has grown much worse since four days; continuous pains in and behind the left ear, increased discharge, fever, loss of appetite, constipation, thirst, poor sleep, vertigo but no vomiting.

---

[1] *Med. Centralbl.*, 1873, No. 39.

[2] *Fortschritte der Medicin*, 1888, p. 166.

[3] *Wien. Med. Wochenschr.*, 1886, p. 135.

[4] *Wien. Med. Presse*, 1890, No. 37.

[5] Baumgarten's *Bact. Jahresberichte.*

[6] Brunner: *Berl. Klin. Wochenschr.*, 1891, No. 21. V. Eiselsberg: *ibid.* No. 23. Tizzoni: *l. c.*

[7] Passett: *Fortschr. Med.*, 1890, No. 2.

[8] Ehlrich: *Zeitschr. Klin. Med.*, 1881.

[9] Karlinski: *Wien. Med. Zeitschr.*, 1888, No. 28; Hochsinger: *Allg. Wien. Med. Ztg.*, 1888; Eschrich: *Fortschr. Med.*, 1890; Longard: *Arbeit. Path. Instit. Munich*, '90, vol. ii.

[10] See my essay on bacteriological diagnosis and prognosis of purulent middle ear diseases. *Deutsche Med.*, *Wochenschs.*, 1888, No. 44.

Present condition: Left mastoid swollen, somewhat reddened; painful spontaneously and on pressure. Violent headache.—External meatus filled with polypi, between which pus shows on slight pressure with probe. During this examination, rigor, Weber's test, with different tuning-forks, to right side. Hearing on left side, *nil*, excepting bone conduction for watch and acoumeter. Slight facial paralysis. Marked pallor. Temperature, 12 M., 38.3. Pulse, 60. Patient refusing any operation whatever, is therefore sent to the medical clinic with diagnosis of lateral sinus thrombosis (meningitis ?). On being received, decided exacerbation of headache, great lassitude, nausea, no vomiting, tongue coated, pharynx angry. The rather narrow pupils react to light and on accommodation. Eyes move freely. On left side submaxillary glands somewhat swollen, fairly sensitive on pressure. Left facial paresis (uvula drawn a little to left side). Other cranial nerves intact (Left ear, see above). Thoracic and abdominal organs without apparent anomalies. Temperature, 40.3, pulse, 103, regular, rather strong. Tendon reflexes normal. Skin reflexes rather active. Motility and sensibility intact. Reaction of vaso-motor system hardly increased. Treatment: ice bag on head and behind left ear, which is cleared with boric acid solution. Ac. muriat. dilut. 1.5 : 150.0. Calomel 0.3. June 29, 1888, A.M., temperature, 38.8, pulse, 114. Towards midnight patient conplains of intolerable headache, cries out aloud, wants to jump from bed. Hypodermic of 0.015. Morphine brings rest and relief, also sleep. No convulsions, no gnashing of teeth. Left mastoid more sensitive; ear itself does not pain, has ceased entirely to discharge. Some vomiting after drinking milk.

3.30 P.M.—Temperature, 40.9; pulse, 88; rigor for 30 minutes; Very violent, paroxysmal headache. Morphine 0.01 subcutaneously relieves, but briefly. Consciousness somewhat obscured.

Pulse distinctly slower. Patient again rejects any operation, and is transferred to surgical clinic, where death sets in 30, A.M., with paralysis of respiratory centre.

*Clinical diagnosis:* Lateral sinus thrombosis. Localized meningitis.

*Anatomical diagnosis:* Basal purulent meningitis. Thrombosis of semicircular sinus, with perforation of its posterior wall. Caseous plug in sinus. Perforation above sinus, communication with putrid cerebellar abscess. Septic thrombus in bulb of jugular vein. Obliteration of left pleura. Compensatory emphysema of right lung. Acute enlargement of spleen.

### POST-MORTEM EXAMINATION OF PETROUS BONE, WHICH COULD NOT BE DISSECTED BECAUSE REFERRED TO PATHOLOGICAL MUSEUM.

0.5 *cm* to the inside of the petro-squamous suture on the tegmen tympani an opening 2 *mm* large, is found; a probe can be pushed through it to a curious spot of the same size on the exterior of the mastoid. The posterior portion of the drum-cavity as well as the mastoid interior are filled with cholesteatomatous masses which protrude, partly, from the posterior wall of the bony auditory canal and are covered by the granulations recognized during life. A probe introduced through this carious posterior wall in the direction towards the sinus reaches the perforation in the sinus wall, described in the above report, through a small carious opening in the sulcus. The anterior wall, too, of the external auditory canal is carious.

### DETAILED DESCRIPTION OF CEREBRUM, ETC., ACCORDING TO THE POST-MORTEM REPORT OF PROF. ARNOLD.

Thick skull, broad diploë, deep vessel grooves. Internal adhesions of dura over parietal bones; much fluid blood and soft fresh clots in longitudinal sinus. No thrombi. Dura, delicate, transparent; visceral surface moist and glistening. On uncovering left hemisphere, collection of pus is found along blood-vessels in the region of lowest cerebral convolution. Corresponding parts on right side free. Pial veins well filled. Much pus around chiasma and optic nerve, especially on left side. On severing tentorium from its attachment to petrous bone, very fetid discharge. Both transverse sinuses contain fluid blood, and fresh dark red clots. No thrombi. Same conditions in right semicircular sinus. Left semicircular sinus is thrombosed and divided into two nearly equal parts, both of which are filled with soft, either discolored or dark red, thrombi. In the middle, a caseous mass of the size of a split pea; corresponding portion of posterior sinus wall is missing. A probe sinks from here into petrous bone. Fossæ Sylvii largely closed by purulent exudation. Caseous spots on crura cerebri, chiasma, and superior aspect of cerebellum; in sinus, immediately under attachment of tentarium to petrous bone, round macerated opening in dura which adheres to neighboring portion. On loosening this adhesion, fetid pus oozes from cerebellum. In left cerebellar hemisphere a putrid abscess 4 *cm* long and 3 *cm* broad, in hemorrhagic area. Right cerebellar hemisphere intact. At base of brain, grayish dirty discoloration of cortex; flattening of gyri, especially on left side, although but little exudation on convexity.

CASE 3.—This case deserves notice on account of the two cerebral abscesses remaining absolutely latent during life until a week before death, as well as of the fact that one abscess was situated in the cerebrum of the diseased side while the other was in the cerebellum of the healthy side. Nevertheless, there were only phenomena due to intra-cranial pressure present during life. For notes on everything which I did not observe personally in this case, I am indebted to the patient's father-in-law, who, himself a physician, attended the patient during the critical period.

Patient, a Russian merchant of thirty-five, had scarlatina in his childhood, with resulting purulent inflammation of the left middle ear. Pains were not present till a week ago; and the discharge from the ear has, apparently, ceased altogether lately. Besides the aural disease, patient is suffering from "enlargement of the heart," and for that reason came to Nauheim from Russia to take warm gas baths. The trip was made by the otherwise healthy and well-built patient without the least signs of discomfort. The treatment by baths begun two weeks ago is apparently borne well.

A week before death he had great pains in the depths of the right ear, and most violent headache. These symptoms are said to have been the only notable one till two days ago; there was neither fever, nor vomiting, nor giddiness, nor impairment of consciousness, but insomnia, which was ascribed to the pains; no disturbance in the course of any cranial nerve or of motility; no pupillary change. Two days before death "*rigor*," with pulse 36. Three hours before death "*rigor*," with pulse 136. Immediately after this I saw the patient. He still retained consciousness enough to assist in the examination of the auditory organ. Healthy left drum-membrane. The right was thickened and reddened in the posterior half, the anterior half was missing; within perforation inspissated whitish-yellowish masses. No discharge in external canal. Three hours later death resulted with intermitting respiration; loss of consciousness only in the final hour.

*Autopsy:* The brain was sent to me two days after death; but as it was already softened, I can only make the following statements as reliable: In the medulla of the right cerebral hemisphere there was an abscess of the size of a hen's egg, lined by a smooth, fairly vascularized membrane $\frac{1}{8}$ *mm* thick; in the left cerebral hemisphere an abscess about as large as a walnut, without abscess membrane. The patient's father-in-law states there was meningitis basilaris. The genesis of the abscess found in the left cerebellar hemisphere cannot be explained. Should it be ascribed to metastasis in consideration of the decided rigors, which occur so rarely with cerebral abscesses?

### EXAMINATION OF PETROUS BONE.

Nothing worthy of note in external meatus. Defect in anterior half of drum-membrane is filled with dry, yellowish, inspissated masses. Posterior half reddened and thickened, without pus layer. Mucous membrane of drum-cavity also thickened and reddened, only in posterior portion some purulent infiltration. Above malleo-incudal joint pin-head caries. Dura above and adjoining, of bluish discoloration and perforated twice. I do not dare decide if the use of warm gas baths contributed to the fatal exacerbation of the ear trouble.

# BILATERAL HÆMATOMA OF THE LOBULE.

By Dr. B. ALEX. RANDALL, Philadelphia.

THE following case seems so unusual that even in its incomplete form it is worthy of publication:

Florence M., aged fifteen, of Irish parentage, was referred to me at the Ear Dispensary of the Children's Hospital on November 28th, by Dr. Walter J. Freeman, under whose treatment she had been for her rhinitis. Each auricle presented a soft fluctuating tumor of purplish-red color at the posterior attachment of the lobule—the larger one on the left being of the size of a small chestnut. Question elicited that the ears had been pierced for earrings four weeks before; but no trouble had been experienced until a week previous, when in an epileptic fit, such as she not rarely suffers from, strong traction had been made upon the lobules or on the rings worn in them, as a measure of resuscitation. The swellings had appeared painlessly in a few hours and remained unchanged except for some decrease and irregular shrinkage on the right. The ring-punctures were empty except for partial closing by slight plugs of epidermis; they were uninflamed and lay wholly external to the swellings and unrelated to them. The tumors were almost free from tenderness, and palpation gave a peculiar boggy feel as if from contained granulations. Incision was made on each side with little pain, giving exit to dark blood with no sign of pus; and the cavities were found to be partly filled with granulations and to extend to the slightly bared lower end of the auricular cartilage. Each was lightly curetted and vigorously rubbed with iodine glycerite, packed with iodoform-gauze and covered with a pressure bandage. This was substituted the next day by a light collodion dressing giving decided pressure—the slightly blood-stained packing being left undisturbed. Two days later the packing was removed, showing the right cavity healing rapidly: the left was suppurating slightly, and, while better, was still unhealed when she withdrew herself from further observation three or four days later.

The usual absence of cartilage from the lobule would lead few to think of hæmatoma or perichondritis in connection with a swelling at this point, and the aspect of the tumefaction was such that many might have carelessly incised without recognition of the non-suppurative character of the lesion and have been surprised to evacuate nothing but blood. Should this method of resuscitating epileptics come into vogue as a substitute for some of those popularly approved, the lesion may become more common; for the present its possibility at least should be recognized, with its relation in this case to an epileptiform disorder.

# A CASE OF BASAL FRACTURE.

### BY JOHN DUNN, M.D., RICHMOND, VA.

Farmer, aged fifty-six, was, in January 16, 1894, thrown from his wagon; a barrel of flour, rolling out of the wagon at the same time, struck him on the right temporal region. Unconsciousness for half an hour resulted. When the swelling in his face subsided he noticed his "face was twisted" and that he "had no feeling in that side of the face." In the latter part of February he consulted me about his right eye. The following condition of affairs was found to exist. *Complete paralysis of fifth, sixth, and seventh nerves of the right side.* There was no sensation in the skin of the face supplied by the fifth nerve. Neuro-paralytic keratitis had set in. The cornea was denuded of its superficial and of some of the deep layers for its whole surface, save a crescentic area, which accurately adjusted its outline to the part of the cornea covered by the upper lid, and a narrow rim adjoining the conjunctiva. Hypopyon was present. The conjunctiva was much swollen and inflamed, and the inferior cul-de-sac covered with a whitish sero-mucous exudate; there was no lachrymal flow. Conjunctiva, etc. insensitive. Ectropion. Eye drawn into inner canthus. Right nostril closed at the entrance by a sero-sanguineous exudate, from which the watery parts had evaporated, leaving a dry, firm, sticky plug for the nasal entrance. Removal of this and examination of the right nose showed it to be perfectly dry and free from secretion; its mucous membrane pale, and covered with a thin whitish film, which proved to be cast-off epithelial cells; mucous membrane absolutely insensitive, (various experiments were made to prove this). Degree of loss of smell, if any, could not be accurately determined, the other side being healthy. Usual symptoms of paralysis of 5th in the mouth and pharynx. Paralysis of the facial nerve complete, as was also that of the sixth nerve. Patient, a farmer, remained under observation only four days, during which time cornea ruptured, and there was much increase of destruction of its substance. Drum normal. There was a slight diminution of the power of hearing in the right ear. The hearing was, however, good. Patient complained only slightly of noises in this ear. No discharge. No vertigo. The symptoms of which the patient complained most were stoppage of right nostril, and the disappearance of, at times, and his inability to locate, particles of food in his mouth. The right eye was not painful.

Patient was again seen July 6th. Condition practically unchanged. There had been a further destruction of the cornea, the remains of which and the iris were now grown together. Eye painful towards night. Hearing reduced to watch at one inch. Some complaint of noises in ear.

In looking for the location of an injury which could cause paralysis of the fifth, sixth, and seventh nerves, and these alone, we naturally seek the apex of the petrous part of the temporal bone, the portion internal to the entrance of the internal auditory canal, and superior to the carotid canal. The line of force applied to the temporal region was most likely directly inward. Were this so, there could result a fracture causing just the paralyses above mentioned. The line of fracture might be directly through the fossa for the Gasserian ganglion, might be so high up as to injure the seventh, while the eighth nerve only a short distance below might escape; the jamming of the fractured segment into the upper part of the cartilage filling the foramen lacerum anterior might have caused the injury to the sixth nerve as it passes forward in the interval between the apex of the petrous part of the temporal bone and the posterior clinoid process of the sphenoid. The patient's general health seemed to be in no way affected by the injury. He declined any treatment, inasmuch as relief could not be promised him. His condition six weeks after the injury is above described.

# A CASE OF OTITIS HEMORRHAGICA EXTERNA.

By JOHN DUNN, M.D., Richmond, Va.

On February 13, 1894, at six in the afternoon, Mr. M., aged thirty, was not conscious of any unusual sensations in his ears. Some time between six and 11 P.M. his left ear became the seat of pain, which increased rapidly in severity until at 1 A.M., when "something burst and a lot of blood and stuff ran from my ear." The pain had become unendurable. Following this discharge the pain ceased, and the ear was only the seat of a dull, unpleasant sensation. When I saw Mr. M., February 14th, at 11 A.M., I found more or less semifluid blood and serum in the external canal, A. S.; when this had been removed with a cottoned probe and the canal cleansed, it could be seen that the skin over the bony part of the canal and over the drum was the seat of a severe inflammation, which had resulted in the formation of numerous small hemorrhages in the skin; these extravasations varied in size from a pin-point to a millimetre in diameter; they were irregularly placed. The drumhead was so swollen that the outlines of the malleus were not to be seen. The source of the bloody serum could not be made out; the seat, however, of the greatest number of the extravasations was in the upper posterior part of the canal near the drum-head. The hemorrhages were in the skin throughout the whole extent of the bony meatus. They did not extend into the skin covering the cartilaginous meatus. The skin in the bony meatus did not appear to be like that on the drum-head, swollen. Examination of the right ear revealed a drum-head normal in color, and save a slight retraction (a condition of long standing), normal in appearance. There was absolutely no sign of inflammatory disturbance visible. Mr. M. was told that the trouble in the left ear was, in all likelihood, confined to the outer skin of the drumhead, and was not the evidence of middle-ear inflammation. At 4 P.M. the same afternoon Mr. M. returned to my office saying that the right ear was beginning to ache just as the left one had done. Examination revealed an acutely inflamed drum-head, whose entire surface was so swollen as to conceal the malleus the full length of the long process. The greater part of the swelling was, however, over the posterior segment of the drum; and the severest inflammatory appearances of the canal were in the upper posterior part adjacent the drum. Mr. M. was made to remain in his room. Treatment was pilocarpine and Rochelle salt, both of which acted well. The next morning there was a slight amount of bloody serum in the canal, while over the posterior segment of the drum was a blister of blood and serum occupying the upper half of the space between the long process and the posterior wall of the canal. There were some few hemorrhagic spots in the upper posterior wall of the canal. In this ear, however, they were not, as in A. S., throughout the whole extent of the bony meatus. On February 16th the contents of the blister had been so far absorbed that a creasing in its covering could be distinctly made out. On February 17th all of its contents had been absorbed. The handle of the malleus was visible its whole extent, and the drum-head showed nowhere evidences of being swollen, although it was congested its entire external surface. No more hemorrhages formed in the external canal. The trouble rapidly disappeared, so that a week later the external canals, including the drum-heads, were in appearance just as they had been prior to the inflammatory attack; nor was there any evidence of any improvement of hearing as the result of the trouble. Naturally there was considerable dulling of the perception of sounds during the time that the drum-heads were swollen.

In regard to the condition of the ears prior to the appearance of the hemorrhages:—Owing to neglect of the nose and naso-pharynx, in which at one time were immense adenoid hypertrophies, Mr. M. suffered from middle-ear catarrh, which had resulted in considerable retraction of both drum-heads, especially the left, and not a little impairment of hearing. Watch A. D. $\frac{1}{3}$; A. S. $\frac{1}{10}$. There has been, however, no demonstrable diminution of the hearing power within the past two years. Nor was there just prior to the nflammation of the external canals above described any acute trouble with the middle ears to serve as a forerunner of such an attack. Gruber is not inclined to look upon "Otitis externa hemorrhagica" as a distinct disorder, and his description of the affection (*Diseases of the Ear*, p. 239) is not as accurate as the history of a case such as the one reported above seems to demand. Politzer, *Ohrenheilkunde*, s. 147, describes very fully this form of inflammation of the external ear. The above case differs from the usual form in that the inflammatory process was most severe on the drumhead and upper posterior part of external canal. Again, Politzer says the "der Höhepunkt dieser Entzündungsform ist in der Regel am dritten Tage überschritten." In the above case the height of the inflammatory attack, which I consider to be the rupture of the vesicles, was reached within twelve hours from the time the patient became aware of unpleasant sensations in his ears. The fact that first one ear and then the other within twenty-four hours became the seat of similar inflammatory attacks is worthy of notice. No cause for these attacks could be found, other than going in and out of an overheated committee room in raw, cold weather.

# INVESTIGATIONS CONCERNING THE AVERAGE HEARING POWER OF THE AGED.

BY PROF. F. BEZOLD, MUNICH.

Translated by Dr. S. E. ALLEN, Cincinnati.

(*With three charts in the text.*)

THE investigations which I desire to report here were begun seven years ago, simultaneously with my school examinations.

The hearing of the inmates of the Infirmary in the suburb Haidhausen was tested, in the same manner as in the school investigations, the doors of this institution being kindly opened to me by the physician in charge, Dr. Schöner. The number of those who had passed the fiftieth year, and whose condition in other respects allowed of an examination, was too few to permit a statistical compilation. Later, our hospital director, V. Ziemssen, gave me the opportunity of examining old people coming to the hospital for other affections. I was thus enabled to make up to one hundred the number of individuals examined. This number is of course still too small to allow statistical conclusions to be drawn, trustworthy in every respect. Still the results will be given in what follows.

Besides the fact that this number (200 ears) is relatively small, it must also be borne in mind that the conclusions cannot be unqualifiedly applied to all persons above fifty years of age. For here exclusively the lower classes were examined, and these in reference to their hearing are subjected during the course of their lives to a much larger number of momentary as well as lasting injuries, than those better situated. The testing, naturally, must be by the simplest, the easiest to make and to control, and the least annoying methods.

With every individual, each ear was isolated and its hearing distance for whispering and conversation tested. All was done under such precautions as were used in my school examinations. (These rules and precautions are to be found in the work referred to.[1]) The space at my command, the wards of the infirmary and hospital, made it possible to examine the great majority at a distance of at least 10 metres. As a rule, this distance was more than sufficiently great, as the results below show.

As in the school examinations, the drum membrane was inspected in all cases, and alterations in color and curvature or defects noted. Where cerumen hindered the examination or obstructed the meatus, it was for the most part removed. An examination of the nose and naso-pharynx had to be dispensed with.

As to tuning-fork tests, in the great majority of the cases, the Schwabach and Rinné experiments could be conducted with an A$^1$ fork, and partly also with an A fork. The duration of bone and air conduction for these forks, as well as the results of the Rinné experiment are published in my *Statistical Results Concerning the Diagnostic Applicability of the Rinné Experiment*,"[2] to which I refer in this connection. On account of the slight intelligence of those examined, we were barred from attempting to determine the upper tone limit, or tones the perception of which happened to be wanting. Such determinations are made by using a continuous series of tones.[3]

With reference to the contraction which the scale experiences in old age at its upper and lower limit, I have conducted a greater series of examinations on private patients, belonging to the better classes, and having therefore more interest in the question. These results appeared in the *Zeitschrift für Ohrenheilkunde*.[4]

The acuteness of hearing for the scale as a whole, which we determined quickest and most completely with the whispering voice, or in case that is not understood, with the ordinary conversational tone, was found to be encroached

---

[1] *Zeitsch. für Ohrenh.*, xv.

[2] *Zeitsch. f. Ohrenh.*, Bd. xvii.

[3] A continuous series of tones as a means of testing hearing, *Muench. Med. Wochenschrift*, No. 38, 1892.

[4] *Zeitsch. f. Ohrenh.*, Bd., xxiii., S. 254.

CHART I.

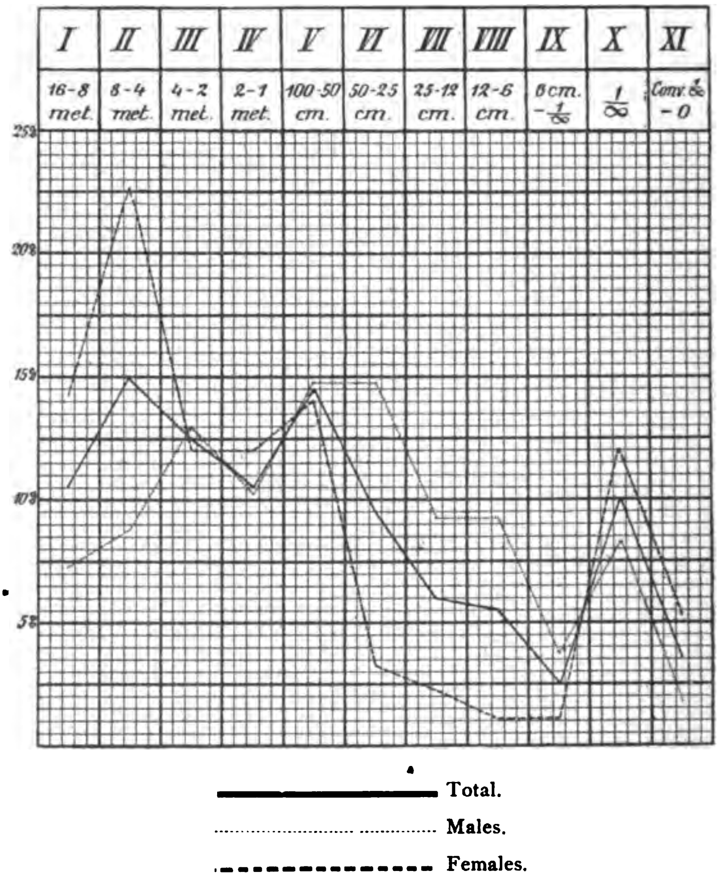

I
II
III
IV
V
VI
VII
VIII
IX
X
XI
16-8 met.
8-4 met.
4-2 met.
2-1 met.
100-50 cm.
50-25 cm.
25-12 cm.
12-6 cm.
6 cm. - 1/∞
1/∞
Conv. 1/∞ - 0
25%
20%
15%
10%
5%
Total.
Males.
Females.

CHART II.

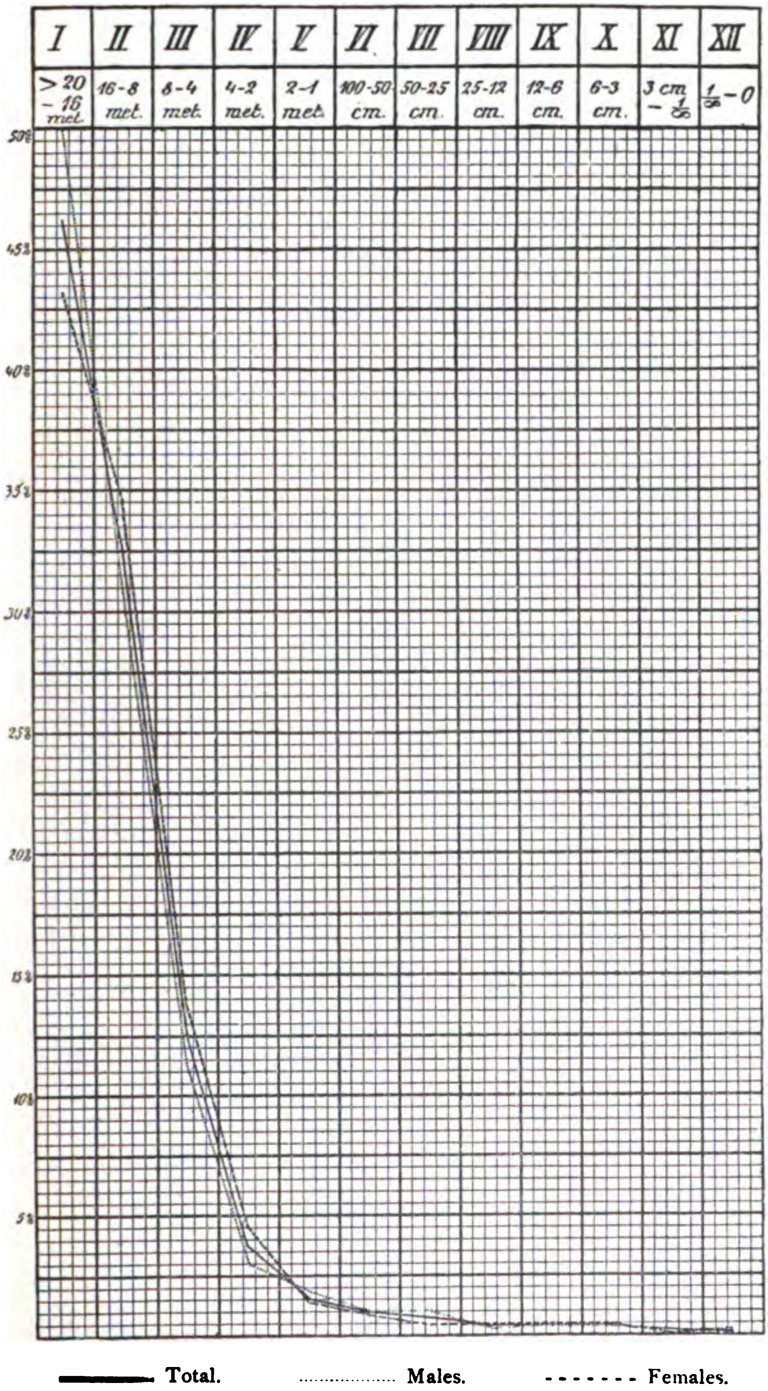
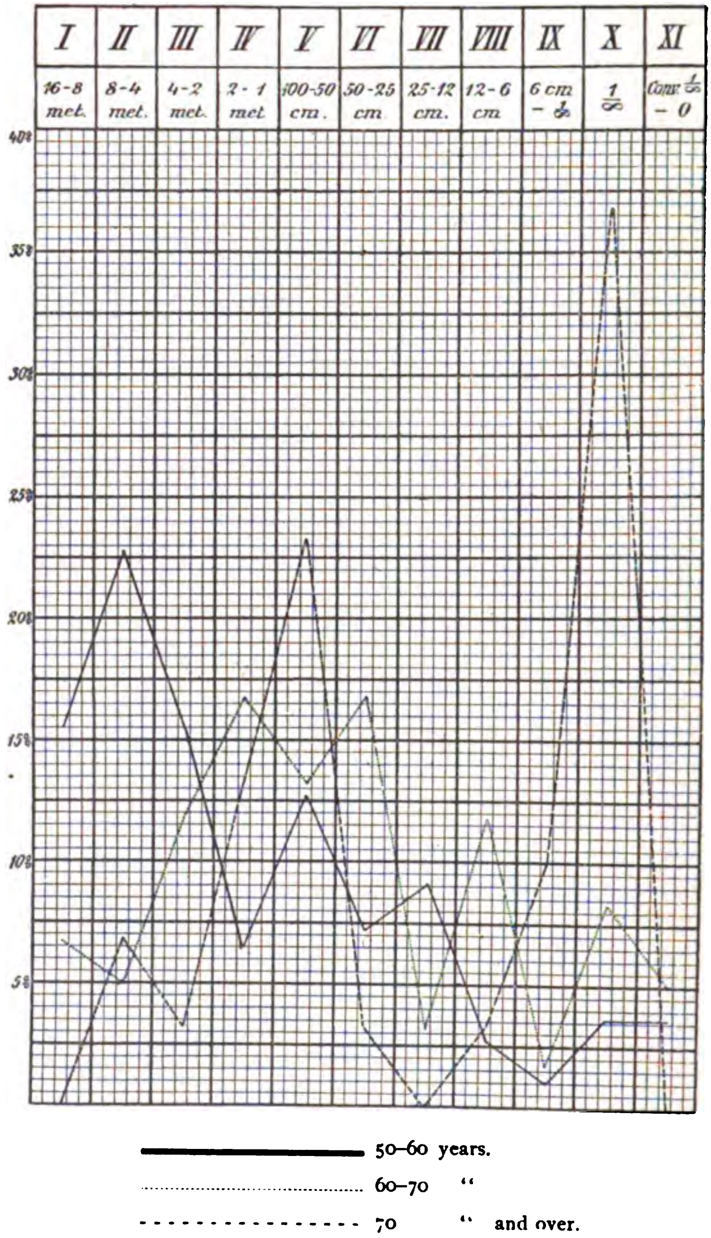

I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
> 20 – 16 met.
16-8 met.
8-4 met.
4-2 met.
2-1 met.
100-50 cm.
50-25 cm.
25-12 cm.
12-6 cm.
6-3 cm.
3 cm – 1/∞
1/∞ – 0
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
Total.
Males.
Females.

CHART III.


I
II
III
IV
V
VI
VII
VIII
IX
X
XI
16-8 met.
8-4 met.
4-2 met.
2-1 met.
100-50 cm.
50-25 cm
25-12 cm.
12-6 cm
6 cm - 1/∞
1/∞
Conv. 1/∞ - 0
40%
35%
30%
25%
20%
15%
10%
5%
50–60 years.
60–70 "
70 " and over.

upon to a marked degree in most of those of the age and class examined (from fifty years on).

The pronounced difference between the acuteness of hearing of the young and the old can be seen at a glance if we represent graphically the numerical differences found. This is done in Charts I and II.

The average acuteness was found distributed among the different decades as follows:

In 110 ears of those between fifty and sixty years whispering was perceived:

At 16 to 8 *m* by 17 or 15.5 %
At 8 to 4 *m* by 25 or 22.7 %
At 4 to 2 *m* by 17 or 15.5 %
At 2 to 1 *m* by 7 or 6.4 %
At 100 to 50 *c* by 14 or 12.7 %
At 50 to 25 *c* by 8 or 7.3 %
At 25 to 12 *c* by 10 or 9.1 %
At 12 to 6 *c* by 3 or 2.7 %
At 6 to $\frac{1}{\infty}$ by 1 or 0.9 %
Whispering uncertain ($\frac{1}{\infty}$) by 4 or 3.6 %
Conversation uncertain (— 0) by 4 or 3.6 %

In sixty ears of those between sixty and seventy years, whispering was perceived:

At 16 to 8 *m* by 4 or 6.7 %
At 8 to 4 *m* by 3 or 5.0 %
At 4 to 2 *m* by 7 or 11.7 %
At 2 to 1 *m* by 10 or 16.7 %
At 100 to 50 *c* by 8 or 13.3 %
At 50 to 25 *c* by 10 or 16.7 %
At 25 to 12 *c* by 2 or 3.3 %
At 12 to 6 *c* by 7 or 11.7 %
At 6 to $\frac{1}{\infty}$ by 1 or 1.7 %
Whispering uncertain by 5 or 8.3 %
Conversation uncertain by 3 or 5.0 %

And finally in thirty ears of those seventy years and older:

At 16 to 8 *m* by 0 or 0.7 %
At 8 to 4 by 2 or 6.7 %
At 4 to 2 by 1 or 3.3 %
At 2 to 1 by 4 or 13.3 %
At 100 to 50 *c* by 7 or 23.3 %
At 50 to 25 *c* by 1 or 3.3 %
At 25 to 12 *c* by 0 or 0 %
At 12 to 6 *c* by 1 or 3.3 %
At 6 to $\frac{1}{\infty}$ by 3 or 10.0 %
Whispering uncertain by 11 or 36.7 %
Conversation uncertain by 0 or 0 %

In Chart III the hearing distances of each of these three different periods are graphically represented and placed together for comparison. It was to be expected that here the influence of age would show most plainly, and this is actually the case. Although the three curves, especially those for the second and third decades, have a rather irregular course, still, on the curves of all three decades, culminating points stand out with such distinctness that we cannot be in doubt as to the distribution of the deafness in the individual periods.

The irregularity of the curves would certainly have been less had it been possible to examine more individuals.

That which is characteristic of this distribution lies in this, namely: for each decade there is a different hearing distance under which the largest number of those examined come (corresponding to the culminating points above referred to). Among the 3836 ears of the school children, 46.5 per per cent. perceived whispering at over 16 *m*. From this height the curve falls, quickly at first, and then successively slower, till those ears are reached by which the perception of whispering is uncertain. With those of from thirty to sixty years the curve begins with a percentage of 15.5 for those hearing at a distance of from 16 to 8 *m*. The proportionally greatest number of those at this age (22.7 per cent.) had a hearing distance of from 8 to 4 *m* for whispering. From this point the curve runs unevenly downward, without again reaching a second elevation of note. Among those between sixty and seventy only 6.7 per cent. hear at a distance of from 16 to 8 *m*, and only 5 per cent. at a distance of from 8 to 4 *m*. For this period (sixty–seventy) the most marked elevation of the curve occurs at the distance-periods 2 to 1 *m* and 50 to 25 *c*. From here on we have an irregular descent. Among those seventy and above we find none with a hearing distance of 16 to 8 *m*. On the curve representing this class there appear two elevations, somewhat apart, the one, representing 23.3 per cent. at the distance-period 1 to $\frac{1}{2}$ *m*, the other, at the distance period $\frac{1}{\infty}$. (As in the school examinations, $\frac{}{\infty}$ is taken to represent an uncertain perception for whispering, that is to say, a perception of only a portion of the numbers whispered.)

*In the decades following that from the fiftieth to the sixtieth year there is therefore not only a successive decrease in the number of those with nearly normal hearing, but there is also a successive increase in the degree of the deafness.*

This last appears plainly in Chart III from the movement of the high points of the successive decades to the right.

Let us return to Chart I. On the solid line, representing the total for both sexes, the high point is transferred from the limit of normal hearing to a point indicating a hearing distance of from 8 to 4 *m*. From here it sinks both toward the right and left. In the downward course to the right we find two marked elevations, the first at 100 to 50 *c*, nearly reaching the culminating point again, and the second at $\frac{1}{\infty}$, reaching nearly one third of the height of the second elevation.

It devolves upon us now to seek an explanation for both of these deviations from an even downward course of the curve which, as seen in Chart II, takes place in youth.

A little consideration shows that the way the distance-periods (16 — 8 *m*, 8 — 4 *m*, etc.) are taken is responsible for the second elevation at $\frac{1}{\infty}$. The scale is divided evenly from the ordinate I, representing a distance of 16 to 8 *m*, to ordinate IX, representing a distance of 6 *c* to $\frac{1}{\infty}$, as each succeeding division is one half of the preceding. At ordinate X, however, this relation becomes changed, this period embracing all those who do not perfectly understand whispered numbers close to the ear. Individuals are put into this class if they fail to understand a single number, as well as when they can understand but one of all those experimented with. This is a scope of considerable magnitude, as is easily shown if we experiment with conversational tones instead of whispering. A portion of those placed in this division could understand the former at a distance of 2 *m* and farther, while others at but a distance of from 6 *c* to $\frac{1}{\infty}$. In the last period (conversation at $\frac{1}{\infty}$ to O) only those are put who perceive conversational tones uncertainly or not at all. If those under ordinate X ($\frac{1}{\infty}$) had been tested with conversation they would have been distributed under the preceding six consecutive ordinates, and the elevation at this point been avoided. That this solution is correct follows from the fact that, although in different degrees, in each period of life and with each sex the elevation appears without exception. In the case of the children, this class came but little into consideration, because the number of those markedly deaf is here still small, and those so affected in both ears are sent not to the schools, but to deaf and dumb institutes. There was one individual deaf and dumb from childhood among the one hundred adults examined.

In order to reach an understanding of the second elevation which occurs on the curve representing the total for both sexes (Chart I), we must examine the sexes separately.

The sexes are not represented separately by the curves given in my school examinations, but here in Chart II, I have separated them. The three curves shown in this chart represent the different hearing distances of the boys, the girls, and both together, respectively. These curves are therefore directly comparable with those representing the two sexes and total of the old people.

*With the old people there is a marked difference between the sexes*, while in the school children the males, females, and total have curves falling almost together, all three having a remarkably similar course. The curve for the women reaches its high point at 8 to 4 *m*, from there on it sinks toward the right, showing in its course two elevations, one at 100 to 50 *c*, and the other at $\frac{1}{\infty}$. The curve for the men, on the other hand, reaches its high point at 100–50 *c*, and remains at this height to 25 *c*, and then sinks slower and generally not so considerably as that of the women. At $\frac{1}{\infty}$ it has once more a slight elevation. This can be thus expressed in words: *The number of men who perceived whispering at* 1 *m to* $\frac{1}{\infty}$ *is relatively much larger than the number of women.*

We must seek a cause for this reduction in acuteness just at this level, because at the third elevation at $\frac{1}{\infty}$, also representing those markedly deaf, more women than men are found.

The explanation is to be sought *in the many hurtful influences of their calling*, noisy occupations, detonations, trauma, alcohol, nicotine, etc. Women are not entirely removed from these hurtful influences, as the elevation at the same period (100 to 50c) shows, but they are exposed to a much less degree than the men.

Conversely, we can draw the conclusion from the male curve, ***that it is chiefly a moderate grade of deafness which is produced by the injurious influences above mentioned.***

The first elevation, in the curve representing the total, corresponds to those having, relative to their age, normal hearing. A separation into the sexes shows that this is due exclusively to the women, and that we must consider the smaller number of men as being distributed between the ordinates V and IX. These ordinates represent a hearing distance of from 1 *m* to $\frac{1}{\infty}$.

It is also of interest to consider the curves on Chart II. Here we see that in youth the male ear is somewhat better than the female, as is evident from the greater initial elevation of the male curve. This difference can hardly be considered accidental because of the large number of children examined, and the otherwise similar course of the curves. *The female sex in old age also shows itself to be less resistant, at least toward those influences which cause a high grade of deafness.* This is seen in Chart I, at the third elevation at $\frac{1}{\infty}$.

We come now to the discussion of the objective and functional appearances of the ear in the aged. It seems most fitting to classify the different hearing powers into three groups, corresponding to the three elevations seen on the curve representing the total for both sexes, Chart I. The first group embraces those hearing at a distance of from 16 to 1 M. The second, those with a hearing distance 1 M. to $\frac{1}{\infty}$. The third $\frac{1}{\infty}$ to 0.

The first group includes 97 or 48.5 %.

The second 76 or 38.0 %.

The third 27 or 13.5 %.

It is not to be wondered at if we find a number of alterations on the drum among the first group.

It is well known what great variations from the normal can exist without a greater deafness resulting therefrom. These middle ear changes are of little consequence, because the disturbances most active in producing deafness in old people are to be sought the other side of the middle ear.

The results of objective and functional examinations of these three groups, given in percentages, are as shown in Table IV.

*Table IV.*—Showing the results in percentages of the objective and functional examinations:

| Hearing distances for whispering, determining the three groups. | | | Percentages found. | | |
|---|---|---|---|---|---|
| | | | 16 to 1 *m* | 1 *m* to $\frac{1}{\infty}$. | $\frac{1}{\infty}$ to 0. |
| Meatus....... | | Exostoses | 2.1 | | |
| | | Cerumen | 14.4 | 22.4 | 11.1 |
| Drum reflexes | Normal reflex | Normally placed | 81.4 | 80.3 | 51.9 |
| | | Absent | 5.2 | 10.5 | 7.4 |
| | | Pushed toward periphery | 0 | 0 | 3.7 |
| | Reflex over short process | | 0 | 1.3 | 0 |
| | Sulcus reflex | Visible | 35.2 | 30.3 | 51.9 |
| | | Concealed | 35.2 | 42.1 | 25.9 |
| Color anomalies of drum..... | | Diffuse opacity | 16.5 | 25.0 | 14.8 |
| | | Circumscribed opacities | 23.7 | 26.3 | 29.6 |
| | | Posterior stripe-opacities | 21.6 | 13.2 | 7.4 |
| | | Calcifications | 3.1 | 1.3 | 7.4 |
| Form anomalies of drum..... | | Posterior fold | 6.2 | 9.2 | 7.0 |
| | | Handle of hammer or short process prominent | 1.0 | 0 | 0.5 |
| | | Scars | 5.2 | 7.9 | 8.0 |
| Perforations of drum....... | | With otorrhœa | 0 | 2.6 | 7.4 |
| | | Without otorrhœa | 0 | 2.6 | 3.7 |
| Number of those tested as to bone conduction | | | 100 | 100 | 100 |
| Bone conduction tested with fork a' on the head | | Lengthened | 10.3 | 12.2 | 17.6 |
| | | Not shortened | 48.5 | 53.1 | 5.9 |
| | | Shortened | 41.2 | 34.8 | 17.6 |
| | | O | 0 | 0 | 58.8 |
| Rinné experiment with tuning-fork a'.......... | | Positive, 15 seconds or more | 75.7 | 54.9 | 11.1 |
| | | Positive, under 15 seconds | 24.3 | 35.3 | 11.1 |
| | | ± 0 | 0 | 5.9 | 22.2 |
| | | Negative | 0 | 3.9 | 55.6 |

These percentages become of interest if we compare them with the percentages, obtained in exactly the same manner, in my school investigations.

Obstructing cerumen masses were found among the aged in 7.5 %, and twice as frequently among the women as the men, while among the school children in but 2.6%. This is in keeping with clinical experience.

The triangular reflex at the umbo occurred about as often among the old as among the children, namely, in 77.0%, as contrasted with 77.9%. The complete absence of the reflex existed in 7.5 % of the aged, as against 4.1 % of the children. The more frequent absence of the reflex among the old is probably due to a loss of smoothness of the epidermis of the drum.

Retractions of the drum, to which are reckoned the formation of the posterior fold, the broadening out of the handle, a transference of the normal reflex toward the periphery, and the formation of a reflex over and behind the short process, occur with the following frequency among the old and children.

| | IN CHILDREN. | IN OLD PERSONS. |
|---|---|---|
| Posterior fold. | 7.4 % | 7.0 % |
| Hammer handle broadened, or short process prominent. | 2.3 % | 0.5 % |
| Normal reflex pushed toward periphery. | 5.0 % | 0.5 % |
| Reflex over short process. | 0.9 % | 0.5 % |
| Reflex behind short process. | 3.4 % | 0. |

These figures do but confirm the clinical experience *that obstruction of the Eustachian tube, by which these anomalies of form are caused, is an affection especially of childhood.*

Quite other conditions of frequency existed for those alterations of the drum caused by middle-ear inflammatory processes. There were found namely:

| | | AMONG THE CHILDREN. | AMONG THE OLD. |
|---|---|---|---|
| Diffuse cloudiness of drum | | in 2.1 % | in 18.5 % |
| Circumscribed opacities | | " 12.7 % | " 25.5 % |
| Posterior stripe opacities | | " 4.4 % | " 16.5 % |
| Calcification | | " 1.5 % | " 3.0 % |
| Scars | | " 1.9 % | " 8.0 % |
| Perforations | with otorrhœa | " 1.0 % | " 2.0 % |
| | without " | " 1.0 % | " 1.5 % |

The influence which these opacities had on the hearing is seen in Table IV, which shows, for scars and perforations, with or without existing otorrhœa, a regular increase in percentage with the increasing deafness. Perforations are not found at all in the first column among the relatively good hearing.

The important evidence furnished by this tabulation as to the cause of deafness in old age is *that the different sequelæ of former inflammatory processes are found in a much greater number from the fiftieth year on.* That these alterations can be made answerable only in part for the disturbances in hearing is evident from their frequent occurrence together with relatively good hearing.

The results of the examinations with regard to bone conduction do not admit the drawing of many conclusions. So much is evident, namely, *that in age the middle-ear affections are less frequent as compared to inner-ear troubles.* Taking those of the different hearing distances together, we find an excess of shortening over lengthening, and among the markedly deaf even a total absence of bone conduction in 58.8%.

Among the sixty, with a reduction of hearing distance to 1 *m* and less, who were examined as to the Rinné experiment, there were found:

29 with Rinné +, 15 seconds or more,
19 " " +, under 15 seconds,
5 " " + 0.
7 " " negative, that is to say with bone conduction longer than air conduction.

In all cases where the air conduction exceeds that of the bone by 15 seconds or more, we are justified in excluding any essential affection of the wave-conducting apparatus. An exception to this occurs only in acute middle-ear affections, and none such were present. A decidedly positive Rinné leads us safely to the inner-ear; a shortening or negative result in itself does not allow a safe conclusion when the difference in hearing power on the two sides is great.

One result of these Rinné experiments deserves to be put forward, namely: The normal duration of the Rinné experiment, found in youthful individuals to be 30 seconds for my fork a′, was but exceptionally exceeded. Once it was 31 and once 32 seconds. The conclusion can be drawn *that also in old age, bone conduction in itself does not experience a reduction, but sinks proportionally with the lessening of the hearing distance.* This appears in testing the aged by air conduction with the tuning-fork, watch, speech, etc.

# THE PRESBYCUSIC LAW.

By Dr. H. ZWAARDEMAKER, Utrecht.

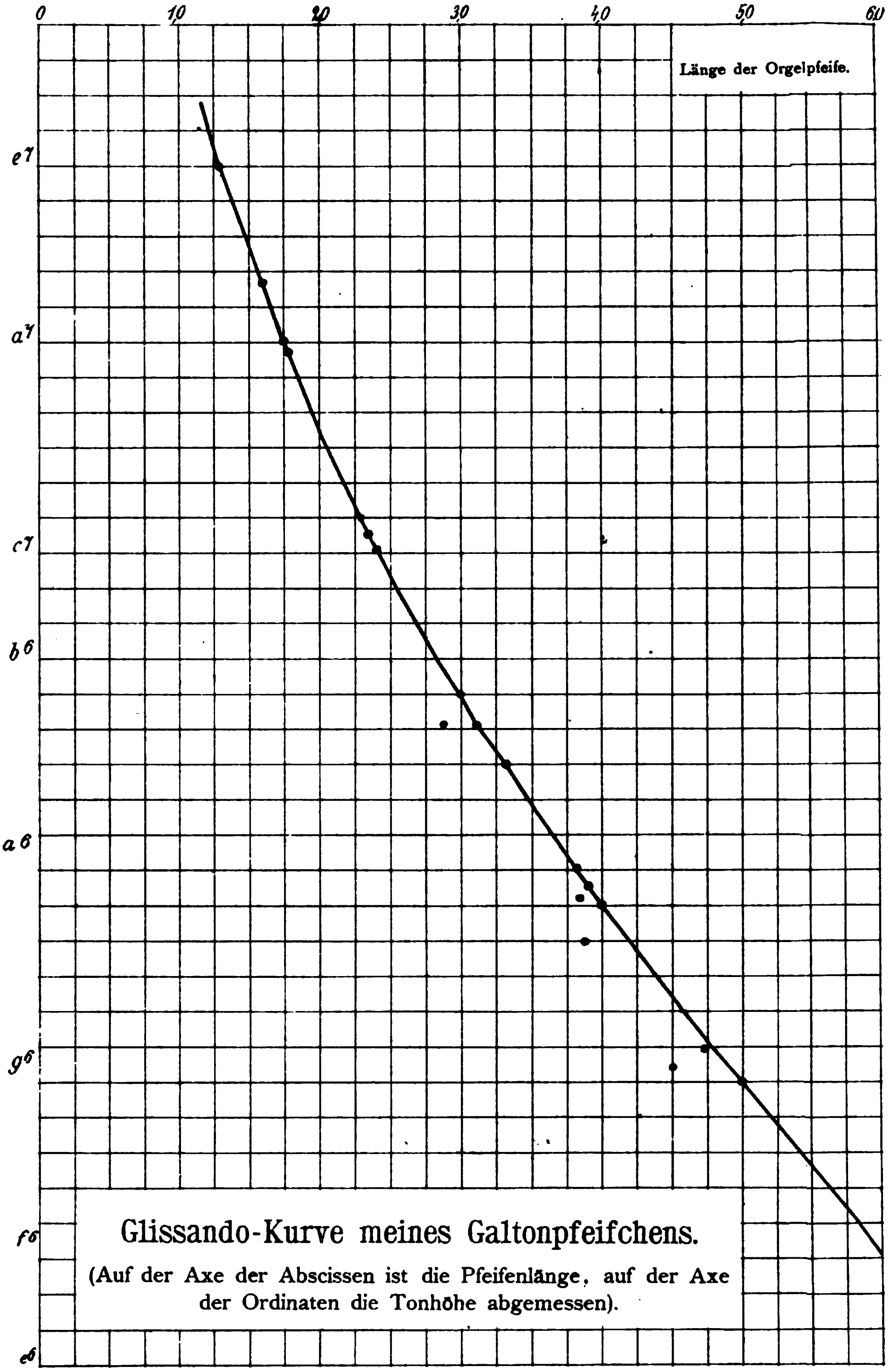
Translated by Dr. S. E. Allen, Cincinnati.

(*With Plates II., III., and IV., Vol. XXIV., German Edition.*)

IN 1890 I was able to determine, by means of the Galton whistle and sounding rods, that the compass of our hearing experienced an important contraction with advancing age. This manifestation begins in youth, and becomes so marked in old age as to be disclosed by the crudest examination. This loss of certain border tones, and the weakening of those immediately following, influences in no slight manner the understanding of speech and the mode and way in which musical tones are perceived. It is therefore probable that in it lies the chief cause of presbycusis. At any rate, the presbycusis is very sharply defined by the contraction of the field of audition, and has even become capable of measurement. I have shown in a former paper[1] that there exists such a contraction, not only of the upper tone limit, but also of the lower. In 1892, in these ARCHIVES, the presbycusic law received a welcome confirmation from a highly honored source. Professor Bezold took the pains to test my observations on one hundred and ninety nearly normal ears, and to compile the results in a couple of good tables. In some respects, however, these numbers differ from mine, and I shall take the liberty of giving, in a form

---

[1] "De Omvang van het gehoor als analagon van het gezichtsveld." *Need Tijdschr. voor Geneeskunde*, 1892, Bd. i., bl. 502.

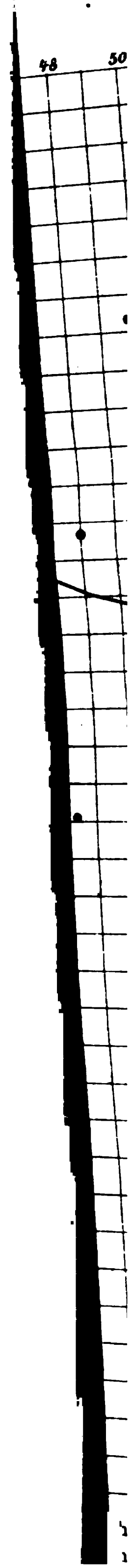


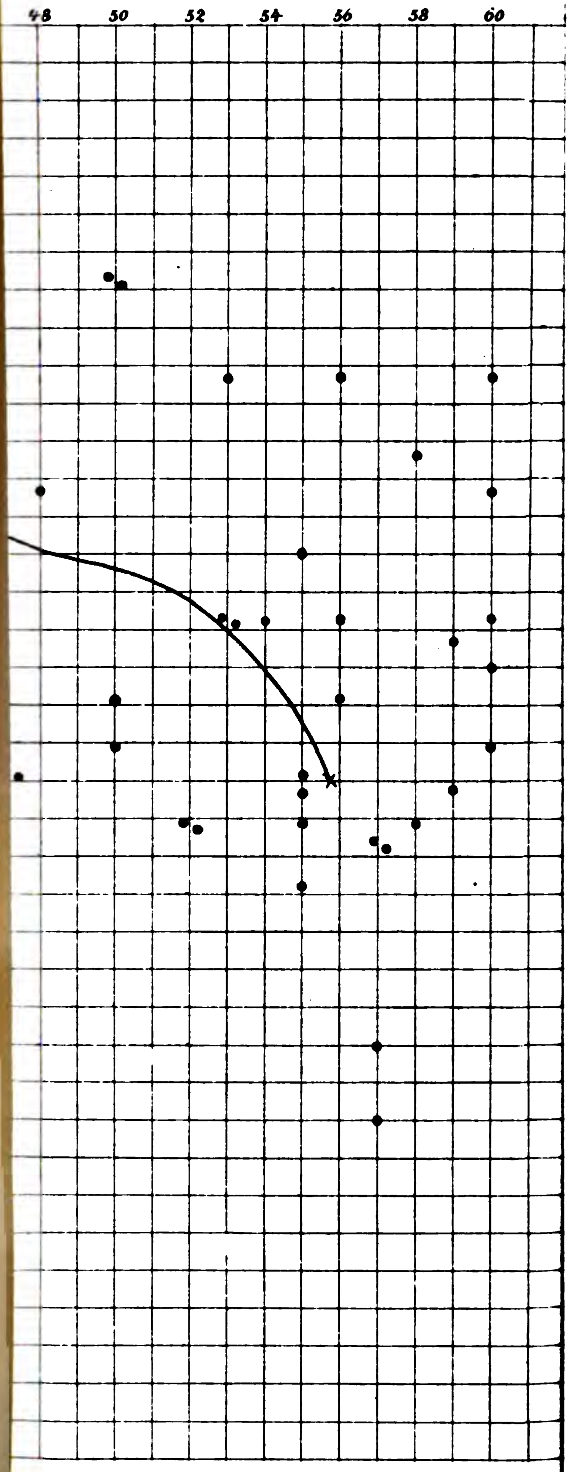
Glissando-Kurve meines Galtonpfeifchens.

(Auf der Axe der Abscissen ist die Pfeifenlänge, auf der Axe der Ordinaten die Tonhöhe abgemessen).

VERLAG VON J. F. BERGMANN, WIESBADEN. KGL. UNIVERSITÄTSDRUCKEREI VON H. STÜRTZ, WÜRZBURG.

PLATE II. Curve of my Galton Whistle. Pipe lengths on the axis of abscissæ; tone heights on the ordinates.


48
50



vhole 219 observations are on the pitch of the tones on the

similar to Bezold's, the data collected by me, so as to permit a comparison.

Since the beginning of 1890 I have determined, with the greatest care, the upper limit in 219 perfectly normal ears. All these persons had a hearing distance for whispering of at least eight metres (the size of the room in which, in the beginning, my observations were made). Later on, a room ten metres in length was obtained, and then this latter distance required as a guarantee of normal acuteness. Even from among those most advanced in age, no one was taken who could not stand this test. In addition, an exact otoscopic and rhinoscopic examination was made. *All these 219 ears can therefore be considered absolutely normal.*

In the accompanying table the numbers are arranged according to Bezold.

As is evident from the table, the compass of our hearing experiences a continuous contraction from earliest youth to the most advanced age. This contraction takes place unusually regularly, for the mean for each group is:

| | |
|---|---|
| Under 10th year | 1.22 |
| From 10th to 20th year | 1.39 |
| " 20th " 30th " | 1.39 |
| " 30th " 40th " | 1.58 |
| " 40th " 50th " | 2.23 |
| " 50th " 60th " | 2.93 |
| Over 60 years | 3.03 |

The regularity is so great that it would be worth while to construct a curve, which would give the course of the contraction better than mean values do. If, however, this more exact delineation is to have permanent and general value, not the numbers on the whistle, but the heights of the tones to which they correspond, must be taken as a basis. Formerly I tried to accomplish this conversion by incomplete methods. To this end I made some approximate estimations in the *Archiv f. Ohrenheil.*, Bd. xxxii., S. 53. With the aid of my honored friend and former colleague, Dr. J. D. van der Plaats, I was able to better the methods, in so far that I can now convert quite accurately the scale of my whistle into musical intervals. At another time I hope to make a more extensive communication concerning this. Here I shall give but the principle of the method, so as not to interrupt the train of thought too much.

If an organ pipe is blown under constant pressure, the nodes and wave crests occur at certain places, determined by the length of the pipe and the pressure. The positions of the same are not altered when different gases are employed. In the known formula, $\eta = \frac{v}{\lambda}$ (where $\eta =$ the number of vibrations, $v =$ the velocity of the sound, and $\lambda =$ the wave length), $\lambda$ has an unchangeable value. One is therefore justified in forming a proportion between the number of vibrations and the velocity, thus: $\eta : \eta' :: v : v'$.

I took for my experiments two gases, everywhere at hand, ordinary air and illuminating gas. This latter had in Utrecht at the time of my experiments a sp. gr. of 0.39. According to the laws of physics (vel. of sound in air and gas), $\eta : \eta' :: 1 : 1.54$. That is to say the pitch of the two tones which one gets on sounding an organ pipe first with air and then with gas differs by an interval of one-fifth. Fundamental tone and fifth are as one $1 : 1.5$, which is about the same ratio as accidentally found between the two tones produced by air and gas respectively.

This permits the gauging of the Galton whistle. If $\eta'$ is the fundamental tone of a person, the organ pipe which gives this tone with gas, gives with air a tone $\eta$, a fifth lower, for $\eta : \eta' :: 1 : 1.54$. This last tone ($\eta'$) can also be produced by sounding a shorter pipe with air. In other words we get two lengths of pipe whose tones $\eta$ and $\eta'$ differ by an interval of a fifth. If we make several such determinations on persons of different ages, we get a number of pairs of pipe lengths. (Instead of gas and air we can use other gases and thus determine the much varied intervals.) A curve can then be constructed which gives the increase in height of tone relative to the shortening of the pipe.

For the Galton whistle with which I made my experiments, the curve has the form shown in Plate II.

We have determined up to now, the form of the curve alone, and not the situation of the same in the system of co-ordinates. To get at this, we need yet the absolute pitch of some one point on the curve. If we obtain this the situation of the other points follows. The fundamental tone for childhood is at 1.25 on my whistle, and comparisons with sounding rods show that this same note is produced by a rod sounding e$^7$. We can therefore put 1.25 of the whistle equal to e$^7$. The curve then teaches us the numbers on the whistle that corresponds to the second, third, fourth, fifth, etc. We find:

Taking e$^7$ = 1.25.

d#$^7$ = 1.5
d$^7$ = 1.8
c#$^7$ = 2.1
c$^7$ = 2.4
b$^6$ = 2.8
a♭$^6$ = 3.1
a$^6$ = 3.7
g#$^6$ = 4.3
g$^6$ = 4.8
f#$^6$ = 5.5
f$^6$ = 6.1
e$^6$ = 6.8
d#$^6$ = 7.4
d$^6$ = 8.0
c#$^6$ = 8.7
c$^6$ = 9.3
b$^5$ = 10.0
a♭$^5$ = 10.6
a$^5$ = 11.8

In this table the distances of the intervals are determined in a purely physical way and they have absolute value.

Alone the placing of e$^7$ and 1.25 as equal is more or less arbitrary, for the intensities of the tones produced by the rods and whistle are not similar. Therefore it is possible that with the first another tone, probably lower than with the latter, is found to be the limit-tone. However, even in this case the presbycusic law remains unshaken, because the calculation of the intervals is independent of the absolute position of the tones.

Let us now convert into absolute pitch the 219 observations on normal ears of different ages. The curve allows us not only to find out for each case between which tones of the chromatic scale the limit-tone is situated, but also to determine most exactly the distance to the next higher or lower interval. Instead of giving the numbers we have preferred to give a graphic delineation, as in Plates III. and IV. Here again on the axes of ordinates are the heights of the tones, and on the axes of abscissæ the ages of the persons experimented upon. Each dot represents an observation. Together they form a sort of milky way which expresses in itself the presbycusic law. The system of dots sinks toward the right, toward the side where those of advanced years are found. An average course can naturally be obtained from the mass of individual observations. The dots were grouped into periods of four years each, and the mean of each group calculated. A line, uniting the mean numbers thus found, may therefore be taken to represent the law. Examining the same, we find the upper limit as follows:

In the 7th year at $e^7$.
In the 14th year it lies a division lower.
Up to the 28th year it remains about the same.
By the 32d year it has reached $d^{\#7}$.
In the 40th year it sinks to $d^7$.
In the 43d year it goes down to $c^{\#7}$.
In the 51st year it is lowered to $c^7$.
In the 54th year it sinks to $b^6$.
In more advanced age it sinks still lower.

All in all five half tones are lost up to the beginning of advanced age. Later the average person loses about two half tones more. Perhaps we may be allowed to place the total presbycusic contraction of the upper part of the scale at an interval of one fifth, that is from $e^7$ to $a^6$. From these average values the single observations vary more or less. For the first half of life the variations do not exceed half a tone; later on, in the second half, the variations can reach a whole tone. A practical otology will have to take this into account.

The formulation of the law, as just given, is evidently somewhat different from that which I advanced formerly in the *Archiv f. Ohrenh.*, Bd. xxxii., S. 53, and which was accepted by Gradenigo in his article on labyrinth diseases in Schwartze's handbook. The difference is only apparent however, for we must bear in mind that the numbers in the present paper correspond to average values, while the former investigations were to determine the limit where the normal ceases, and the pathological begins. If we examine the plate from this standpoint, it is evident that the investigations in the year 1890 are still of exact value. This is to be wondered at, because, at that time, very inexact methods were used in finding the absolute pitch of the whistle.

The average presbycusis is therefore to be reckoned to be an interval of one fifth, that is to say, the contraction of the upper limit is, on an average, from $e^7$ to $a^6$. A presbycusis may be considered normal, however, which is as much as a sixth, that is to say, a senility of the organ of hearing reducing the upper limit from $e^7$ to $g^6$.

Let us return to the observations from which we formulated the law. We find some differences if we compare the original numbers, not yet converted into denominations of absolute pitch, with those of Bezold. (The numbers of Bezold do not admit of such conversion.) One difference is that the Bezold numbers form less regular rows, and a second is that the average values for youth and extreme old age are not separated so widely from each other. These differences make the law less evident from Bezold's statistics. The causes can be two-fold. In the first place, Bezold extended his examinations to persons having a slight reduction of normal acuteness of hearing. The influence which individuals with a hearing distance for whispering of between 5 and 8 or even 10 *m* exercises on the average values, must lead to some error imperceptible in advance. The chief reason for our differences is due, however, if I do not err, to differences in the Galton whistles.

Bezold's has (as mentioned l. c., S. 262) so many accompanying sounds that, in the beginning, the feasibility of making the examinations was doubted. Mine is, on the contrary, nearly free from accessary noises. Accident brought this instrument into my hands, as it is the best of seven with which I was able to experiment.

The cause of the accessory noise, coarse errors of construction excepted, can be owing to either an improper distance between the slit and the lip of the whistle, or to the three-edged, cut-off shape of the slit.

The first cause is active when the instrument maker choses a distance which is most fit for producing a tone which lies an octave below the limit-tone for youth. Then 6.8 of the scale will be the preferable length of the whistle. The normal limit tone can, however, be produced only with very sharp accessory noises, and the instrument will appear unfit for investigations such as ours, although of use in pathological cases. The second of the above causes is nearly always present, and asserts itself more or less. A perfectly pure tone is theoretically not to be expected. I am trying to better these defects by a small alteration in the construction of the whistles, and hope to be able thereby to essentially increase their usefulness. As it is now, one must select a fairly good specimen from a larger assortment.

The presbycusic law can be studied, however, more or less exactly with theoretically incomplete instruments, only one must not be surprised if the several observers come to different quantitative results. Qualitatively the estimations are always similar, as mankind is, in all places, similarly constituted, and the Galton whistles, in all essentials similarly constructed. There exists, therefore, only a quantitative difference between Bezold's figures and mine, a difference great enough, however, to cause Bezold to attribute to presbycusis a far less importance than I have felt justified in doing.

Taking the above data as a basis, none of our readers will declare it hazardous if I now conclude:

1. The compass of the human hearing contracts a half octave at its upper limit up to the period of advanced old age. (Average a fourth, maximum an one fifth.)

2. During advanced age proper the contraction of the scale increases.

3. The upper limit is in youth at $e^7$, in advanced age at $a^6$, (average values). As extreme, $g^6$ becomes the limit in normal hearing old people.

A lower limit may be taken as a sign of pathological conditions.

Fig. 1.

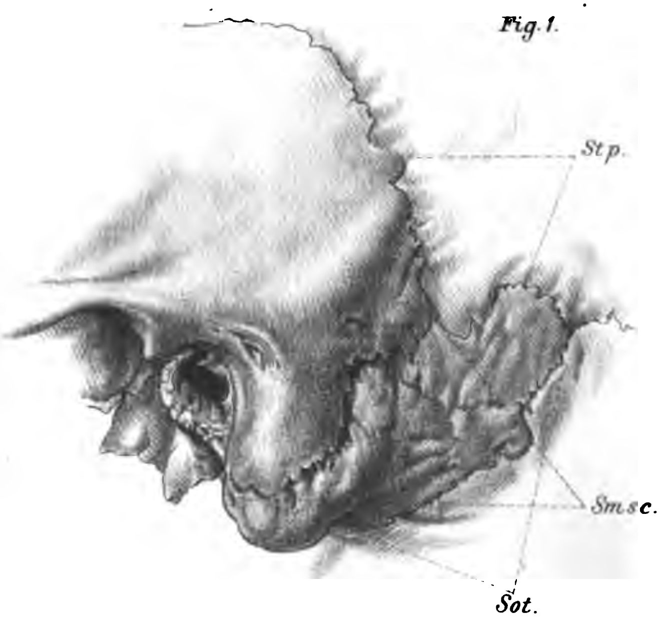
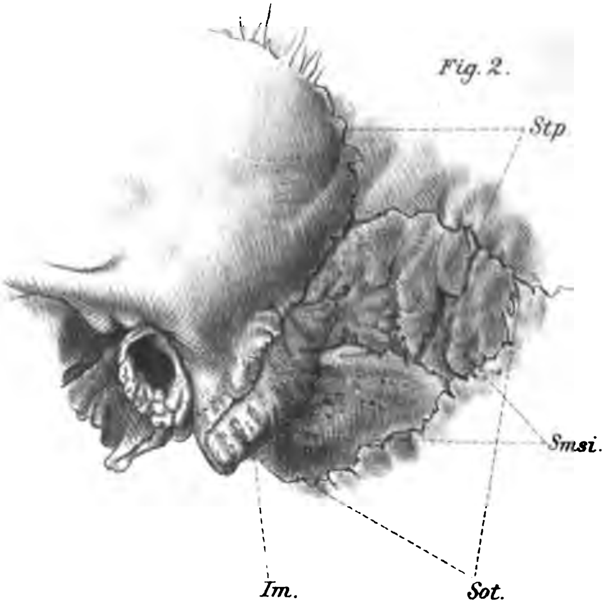
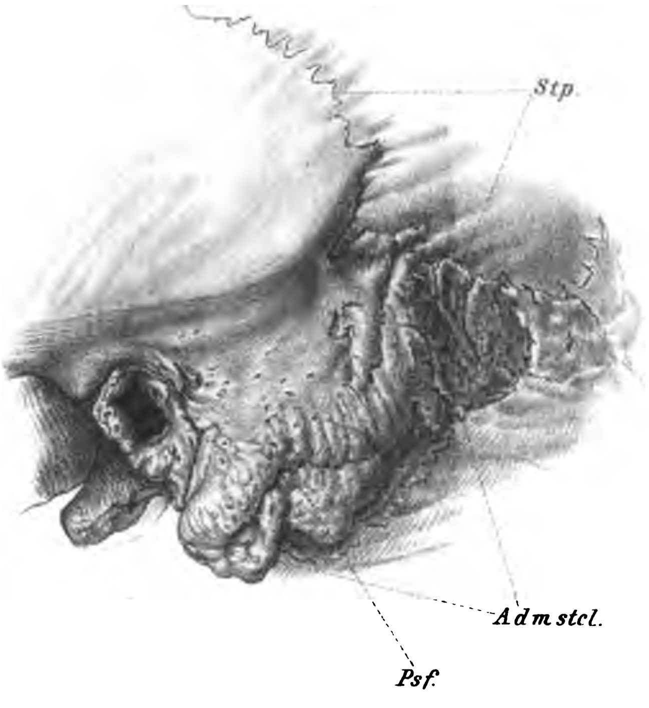


Fig. 2.



Verlag v. J. F. Bergmann Wiesbaden.

Fig. 3.



Lith. Anst. v. C. Kirst, Leipzig

# A HITHERTO UNDESCRIBED COURSE OF A DISEASE OF THE MASTOID PROCESS.

BY PROF. S. MOOS, HEIDELBERG.

Translated by Dr. J. A. SPALDING, Portland, Me.

(*With three Figures on Plates V. and VI. of vol. xxiv, German Edition.*)

THE chief role in this case was played by the mastoid fissure, which forms upon the exterior of the mastoid process the continuation of the petro-squamous suture. Gruber first (1) called attention to its importance, and later, Kirchner (2), Kiesselbach (3), and Bezold (4) have gone still deeper into the subject. I will give an abstract of their statistics at the end of this paper, which contains the results obtained in the Heidelberg Anatomical Collection.

Kirchner refers to three cases of mastoid disease in elderly people in which the chief role in the rapid extension of the morbid process upon the outer surface of the bone was played by the squamo-mastoid fissure. His cases were especially characterized by persistent pharyngeal catarrh, extending into the middle ear without perforation of the *Mt* with but little if any pain, and in two cases by a relapse of the mastoid swelling in from a fortnight to four weeks.

I have but once seen a case like these of Kirchner's with chronic pharyngeal catarrh, tinnitus, and deafness with neg-

---

[1] *Wien. Med. Wochensch.*, 1867, No. 53.

[2] *Archiv f. Ohrenhlkde.*, xix., p. 190.

[3] *Archiv f. Ohrenhlkde.*, xv., p. 238.

[4] *Archiv f. Ohrenhlkde.*, xiii., p. 51, and *Deutsche Med. Wochensch.*, 1881, No. 28.

ative condition of the *Mt.* A painless abscess as large as an egg formed within a single day and disappeared rapidly after making an incision. In after years there were frequent relapses of the aural catarrh, without the former mastoid complication.

Bezold, I may remark, has repeatedly called attention to the fissure in question as a cause of *rapid* mastoid abscesses *in children.*

The fissure of which we are speaking runs from the incisura parietalis in an oblique direction over the mastoid process, and either reaches quite out to the stylo-mastoid foramen, or ceases this side of the same. In the former case it is called complete, in the second incomplete. (See Fig. 1). From a practical point of view this distinction is of insignificant importance, whilst the distinction between a *genuine* and a *pseudo*-fissure (See Fig. 3) is of more importance, inasmuch as the genuine fissure may excite rapid extension of the suppuration upon the external surface of the mastoid, whilst the pseudo-fissure with its more or less numerous cavities or crevices in the bone itself only favors the passage of *slighter masses* of suppuration along the vascular sheaths.

Mr. C. a robust man, suffered from scarlatinal otitis in each ear in childhood. The discharge persisted on both sides up to February, 1892, when he had an attack of influenza. On his recovery a fresh discharge appeared in the right ear but without any pain, and leading rapidly to a tumefaction over the mastoid process, at times larger, then again decreasing spontaneously in size. At one time it disappeared entirely. The aural suppuration also varied in amount. When it was small the patient had much headache. At one time the neck was swollen and very painful.

Present condition, May 31, 1892.

Pharyngeal catarrh; large central perforation in left *Mt* but no suppuration. Right ear, profuse suppuration, small perforation, *Mt* congested, pus in the tympanum, mastoid swollen, but not painful to the touch. Pressure over the mastoid causes increased otorrhœa.

The patient cannot raise himself in bed, but once up, he can sit without support. He cannot however rest on either arm on account of pain, extending along the neck and spine. All attempts to move the head in any direction cause violent pain. Owing to this no instillations could be made into the ear.

Hearing: Conversation at ¼ M. Fork A—1 not perceived, the others up to the twiced scored octave feebly perceived. Watch only by B. C. and 2 *cm* in the left ear. Repeated paracentesis *Mt* and removal of abundant masses of pus by syringing. Apparent cessation of the suppuration on the entire day of June 8, when suddenly at night there was so abundant a discharge of pus from the right meatus that a cup had to be held beneath to catch it. Staphylococci were discovered in some specimens.

As the affection seemed to be mastoiditis, an operation was performed on the next day, and seemed all the more indicated as the excessive flow of pus had continued for several hours.

The usual incision was followed by so abundant hemorrhage that six vessels had to be ligated; and the parenchymatous bleeding was so great that tamponage had to be resorted to for a long time before the operation could be proceeded with. No pus being found at a depth of 1.8 *cm* in the bone, nor any about the entire field of the operation, I then desisted. Two sutures were applied with iodoform gauze. In four weeks the incision was healed up from the bottom, without any rise in temperature.

So far as the ear was concerned the case ran on in this way: Up to June 8th, four days after the operation, no secretion; but during that evening *abundant discharge from the meatus.*

This lasted till nine the next morning when it again ceased, only to reappear in abundance the same evening, and to continue, though in daily diminishing amount, till the 17th of June, when it was very slight.

On the 28th of June, after massage over the mastoid for a few days previous on account of a doughy feeling over that region, the discharge burst forth once more in abundance from the lower end of the old incision, but for only three or four hours, when it again disappeared. The pus was driven out by massage over the mastoid, during which process much vertigo was complained of by the patient.

July 2 no swelling over the mastoid, no trace of aural suppuration.

Pharyngeal catarrh and a painless course characterized this case as well as that of Kirchner's. The pus enlargement lay at the lowermost end of the apophysis, and a little to the middle line, but the greater part of the apophysis was free from swelling. The cells of the mastoid contained no pus at all; the antrum was probably obliterated, for I never succeeded in syringing through from the external meatus. This sclerosis originated in all probability from the scarlatinal otitis.

The pus-swelling at the lower end of the apophysis was *intermittent*. So was the discharge from the meatus. Its profuse reappearance after several days of quiescence was evidently due to the regurgitation of the pus from the abscess through the squamo-mastoid fissure. The stiffness of the neck and pain all along the back and neck were caused by inflammatory infiltration of the inter-muscular connective tissue, caused by previous sinking of pus.

The vertigo and tinnitus appearing during massage were due to more violent pressure upon the labyrinthine windows. The absence of the same symptoms at a later stage showed that the suppurative process had ceased. The entire course of the affection proves that in such cases trepanation of the mastoid and even Wilde's incision are unnecessary. At all events massage carefully performed should precede surgical manipulations.

## RESULTS OF EXAMINATION OF FISSURES, PSEUDO-FISSURES AND CRACK-LIKE BONY CAVITIES IN THE COLLECTION OF SKULLS IN THE ANATOMICAL INSTITUTE AT HEIDELBBERG.

Total number of skulls 239, of which 29 were from children.

Three various types of particular formation of fissures on the mastoid process:

I. Type of the true fissure in the anatomical sense, beginning at the incisura parietalis squamosa of the temporal bone, runs on the mastoid process to its tip, and then bends forward and upward toward the external auditory meatus. The linea semicircularis occipitalis superior runs separate behind the mastoid fissure to the point of insertion of the sterno-cleido-mastoid muscle.

II. Total absence of the fissure. Well-marked tuberosities on the mastoid, a small emissary high up, a little higher still than the spina supra meatum. The linea semicircularis occipitalis superior does not extend to the mastoid process. The chief emissary lies in the occipital bone.

III. Type of the pseudo-fissure formation.

a. The linea semicircularis occipitalis superior extends into the exceedingly well-marked tuberosity, the zigzag projecting edges of which simulate a fissure. The emissary is at the upper beginning of the pseudo-fissure.

b. Type of the pseudo-fissure which is so highly developed, that there is a deep split, probably caused by the abundant holes in the vessels. In this the upper portion of the tuberosity exhibits no fissure at all.[1]

## SUMMARY.

Two hundred and thirty-nine skulls in all, exhibit some sort of a fissure of the three above types 54 times, that is to say, about 22 per cent.

Perfect fissures in 24 skulls, 11 times double, 4 times on the right side alone, and 9 times on the left alone.

According to Kirchner and Kiesselbach, the fissure remains as a complete suture in the first year of life only.

Kirchner found this closed in 77 per cent. of adult skulls, in a collection of 300. Fifteen were double and 17 unilateral, that is, in 5 per cent. closed on both sides, and in 5 per cent. unilaterally closed, of which but 4 were on the right perfectly closed.

Bezold found the fissure persistent but 4 times in 200 skulls, and in 122 suggested by holes and crevices on the external surface.

The following table, in conclusion, gives some interesting statistics:

---

[1] Here follows in the original a long and minute description of the 54 skulls in which various fissures were found, but which is here omitted for want of space. Those interested are referred to the original.—Translator.

| The Mastoid-Squamous fissure is. | | 1 entirely open. | 2 middle closed. | 3 middle and upper third closed. | 4 middle and lower third closed. | 5 upper third closed. | 6 middle alone open. | 7 lower end open. | 8 direction suggested by holes and crevices. | 9 closed. |
|---|---|---|---|---|---|---|---|---|---|---|
| Age. | Temporal Bones. | | | | | | | | | |
| 1 | 52 | 17.30 | 19.23 | 13.46 | 5.77 | 11.54 | — | 28.35 | — | 3.85 |
| 2 | 26 | — | — | 19.20 | 3.80 | — | — | 23.10 | — | 53.90 |
| 3 | 46 | 4.35 | — | — | — | 4.35 | 2.18 | 39.13 | 17.39 | 32.60 |
| 4 | 52 | — | — | 11.54 | — | 3.85 | 7.70 | 25. | 17.30 | 34.61 |
| 5 | 38 | 7.98 | — | — | — | 5.26 | 2.63 | 23.68 | 13.16 | 47.38 |
| 6 | 32 | — | 3.12 | — | — | — | 6.25 | 6.25 | 3.125 | 81.25 |
| 7 | 30 | — | — | 6.7 | — | 13.3 | 3.3 | 10.0 | 16.66 | 60. |
| 8 to 10 | 24 | — | — | 8.33 | — | — | — | 4.17 | 16.66 | 70.84 |
| 11 to 15 | 30 | 10. | — | 10. | — | — | 10. | 3.3 | 6.77 | 60. |
| 16 to 19 | 18 | — | — | 11.11 | — | — | — | — | 22.2 | 66.67 |

## *Explanation of the Figures.*

These are all natural size.

### Figure 1.

Stp =Sutura temporoa-parietalis.
Smsc.=Sutura mastoidea-squamosa completa.
Sot =Sutura occipito-temporalis.

### Figure 2.

Stp.=As before.
Sot.=As before.
Smsi.=Sutura mastoidea-squamosa incompleta.
Im.=Incisura mastoidea.

### Figure 3.

Stp.=As before.
Admstcl.=Insertion of the sterno-cleido-mastoid muscle.
Psf.=Pseudo fissure, which at a glance is hardly to be distinguished from the true fissure, but which in its totality is impermeable even for the passage of a fine thread.

# Book Review.

**Atlas of Laryngology and Rhinology.** By A. GOUGUENHEIM and J. GLOVER. Large folio. Masson, Paris, 1894.

This comprehensive and exhaustive work from the press of G. Masson, Paris, merits a more lengthy review than is practicable in these pages. The first chapter of the text is devoted to the topographical anatomy of the larynx, the nasal cavities, and the rhino-pharynx considered internally; followed by a consideration of the accessory sinuses, and the septum narium. The anatomy of the maxillary sinus or antrum has received we believe for the first time the attention it deserves. Several cadaveric sections show the anomalies which we are apt to encounter in attempting entrance by operative procedure through the inner wall of the sinus. The author reminds us that at times the middle meatus is a dangerous locality to perforate even for diagnostic purposes, as it sometimes impinges on the orbit, on account of the varying position of the insertions of the turbinate bones, especially the middle ones. In exploratory puncture of the antrum through the inferior meatus, which is recommended, we are reminded that the venous system of the longitudinal sinus may connect through the anterior ethmoidal veins, and become a remote seat of septic absorption, from an injury to the continuity of the mucous membrane within the meatus. These accidents which may infect, through the medium of the venous sinuses, the dura mater and the meninges, should cause us to look well to thorough antisepsis. Alveolar penetration in empyema is not recommended on account of the loss of the molar, and presenting insufficient space for investigation or cleansing purposes. The fenestration of the canine fossa by a free opening is advocated where one may see by the unaided eye or by means of an electric lamp in the corresponding nasal fossa the entire interior of the cavity and have plenty of room for operative work and good drainage.

The relationship of the sphenoidal sinus to the adjacent nerves and venous sinuses, is well illustrated by a series of beautifully executed plates. The anatomy of the frontal sinuses is admirably shown by sections; the methods of catheterization of the different accessory cavities are described, and also the means and locations for the employment of the trochar for diagnostic purposes. This is followed by a detailed description of the authors' technique in the free opening and exploration of the various sinuses. In this respect the work is in advance of anything as yet published. Color is made use of to show the relations of adjacent veins and arteries. A table of distances in centimetres to be made use of in operative procedures is of especial interest. For instance, the distances as regards the frontal sinus are given as follows: from anterior nares to frontal sinus, 6 centimetres to 6.5 *cm* in tapping floor; 7 to 7.5 *cm* or thereabouts in practising catheterization of the sinus by the fronto-nasal duct and natural orifice.

The second chapter of the text is devoted to explanation as to the examination of the larynx, anterior and posterior rhinoscopy, and the clinical appearances of the different affections of the same. The benign, syphilitic and malignant tumors of the larynx are well described. The plates, however, are not equal to those of Krieg.

The nasal affections and septal deformities are not given as much attention as we would expect, nor are the plates particularly well drawn; however, there are indications that foreign otologists are beginning to realize the importance of intra-nasal surgery, and the attention given to the question of adenoid tissue at the pharyngeal vault and its removal, in which connection are displayed some excellent plates, tends to compensate one for other omissions.

The third chapter deals with pathological anatomy, and the plates of adenoid sections are excellent. The author explains the difficulty of getting autopsies on patients with laryngeal and nasal affections who die of intercurrent diseases, a position well understood by laryngologists. Under the heading "Compression of the Recurrent Nerves," a most excellent description is given of the various pathological conditions which are ofttimes so puzzling to the diagnostician. The author shows in a beautiful plate the chain of hypertrophied lymphatic ganglia in proximity to the recurrent laryngeal nerves, very difficult to find on dissection, but so frequently observed in autopsies in the cancerous or tubercular subject. We have observed this fact which the author dwells upon, having found during the past year in two autopsies that the hypertrophy of these glands was the only condition which accounted for a paralysis of the left cord, accompanied by distressing and incessant cough—one in a case of cancer of the stomach, and the other in a case of pulmonary tuberculosis. These ganglionic lymphatic hypertrophies are most important to recognize, and the subject is well treated. There is no mention of cough as a symptom in the clinical description, though paralysis and laryngeal spasm are spoken of. Aneurism of the ascending arch of the aorta and compression by direct pressure of a carcinoma are also described and figured.

Chapter fourth, whose scope is explained in the short preface, deals with the principal operations which are generally done in the superior respiratory channels. The engravings show the positions of the hands and the instruments *in situ*, by means of plates made from photographs of sectional heads furnished by the *École pratique*. The pictures are very graphic and instructive, of inestimable value to the student and practitioner remote from special aid.

After teaching the ablation of adenoids, the use of laryngeal forceps, the saw and snare, the author gives valuable space to the description of that most questionable operation dipolar electrolysis of Garel, Moure, and Bergonié, for the removal of septum deflections. We have already seen too many of the terrible dry cicatrices following the roasting of the tissues, and condemn heartily any proceeding so unsurgical and disastrous in its results. English and American surgeons have already abandoned this operation as well as the use of the thermo-cautery upon the septum narium. Some good points are given in this chapter on the modus operandi of opening the maxillary and frontal sinuses, and the manner of tamponing the nose. The sphenoidal sinus the author leaves in the same obscurity with which other writers surround it. The consideration of operative work is dismissed entirely. The author says, apropos of inflammation of this sinus, they are observed especially by the oculist. "We have observed two cases of alteration in the function of this sinus coincident, it is true, with a grave affection of the face and the nose, with marked eye symptoms, exopthalmus and amaurosis."

We confess to no small amount of disappointment, in our review of this portion of the work, to have found no new and original material, for it is our belief that this question of the sphenoidal sinus and posterior ethmoidal complications will in the near future receive a great deal of attention from oculists and rhinologists.

The treatment by intubation and tracheotomy, laryngotomy and laryngectomy receives very excellent handling both in simplicity of text and clearness in illustrations. The steps in the operations of tracheotomy are better illustrated than in any work with which we are familiar.

Following the forty-eight ten by fourteen inch pages of the text, are over thirty-five elaborate plates, with explanation in French and English of the numerous figures. The text of the book is only in French, but the English description of the plates is quite full enough to make the book very valuable for reference and study to one unacquainted with the French language.

On the whole the volume is the best foreign topographical atlas on the subjects treated; theoretical consideration of the various topics is made subservient to practical suggestion, and careful study of the work is thoroughly rewarded. H. H. C.

# BRITISH NOTES.

## APPOINTMENTS.

**Baber, E. Cresswell**, M.B. (Lond.), L.R.C.P. (Lond.), M.R.C.S. (Eng.), has been appointed Surgeon to the Royal Ear Hospital, London.

**Browne, Edgar A.**, F.R.C.S. (Edin.), appointed Consulting Surgeon to the Liverpool Eye and Ear Infirmary.

**Cheatle, H. Arthur**, F.R.C.S. (Eng.), has been appointed Assistant Surgeon to the Royal Ear Hospital, London.

**Craggs, R. F.**, M.B. (Durh.), B.S., re-appointed Medical Officer to the Throat and Ear Hospital, Newcastle-on-Tyne.

**Herrick, R. W.**, M.D., B.Ch. (Dubl.), re-appointed Honorary Surgeon to the Nottingham Throat, Ear, and Nose Hospital.

**Hudson, C. Leopold**, F.R.C.S. (Eng.), has been appointed Aural Surgeon to the Middlesex Hospital, vice Hensman, deceased.

**Johnstone, James**, L.D.S.R.C.S. (Edin.), re-appointed Honorary Dental Surgeon to the Nottingham Throat, Ear, and Nose Hospital.

**Kenny, A. L.**, has been appointed Surgeon in charge of the eye, ear, and throat, in connection with a new Hospital which has just been established at Melbourne, Australia.

**Lack, H. Lambert**, M.B. (Lond.), F.R.C.S. (Eng.), has been appointed Assistant Physician to the Hospital for Diseases of the Throat, Golden Square, London, W.

**Lee, Charles George**, M.R.C.S. (Eng.), has been appointed Aural Surgeon to the Royal Southern Hospital, Liverpool.

**Lodge, S., Jr.**, M.D. (Durh.), appointed Special Assistant Surgeon to the Bradford Eye and Ear Hospital, vice **Andrew Little**, M.B., C.M. (Aberd.).

**Lyle, Thomas**, M.D. (Glasg.), has been appointed Surgeon to the Newcastle-on-Tyne Throat and Ear Hospital, vice **Burwood**, resigned.

**Macalister, Charles J.**, M.B. (Edin.), M.R.C.P., appointed Consulting Physician to the Liverpool Schools for the Deaf and Dumb.

**Moore, E. Coleman**, M.B., C.M. (Edin.), appointed Surgeon to the Edinburgh Ear and Throat Dispensary.

**Nevins, J. Ernest**, M B. (Lond.), M.R.C.S., appointed Honorary Medical Officer to the Liverpool Schools for the Deaf and Dumb, vice **Macalister**, appointed Consulting Physician.

**Parker, Charles A.**, M.R.C.S. (Eng.), has been appointed Assistant Surgeon to the Hospital for Diseases of the Throat, Golden Square, London, W.

**Shears, Charles H. B.**, L.R.C P., M.R.C.S., appointed Surgeon to the Liverpool Eye and Ear Infirmary, vice **Browne**, appointed Consulting Surgeon.

**Stevenson, Edgar**, M.D., C.M. (Aberd.), appointed Assistant Surgeon to the Liverpool Eye and Ear Infirmary.

**Stewart, Donald**, M.D. (Glasg.), L.R.C.S., L.M. (Edin.), re-appointed Honorary Surgeon to the Nottingham Throat, Ear, and Nose Hospital.

**Waterhouse, Herbert F.**, M.D., C.M. (Edin.), F.R.C.S. (Eng.), has been appointed Aural Surgeon to Charing Cross Hospital.

**Yearsley, P. Macleod**, F.R.C.S. (Eng.), has been appointed Honorary Aural Surgeon to the Farringdon General Dispensary.

## SOCIETIES.

**Sheffield Medico-Chirurgical Society.**—At the meeting held on October 26, 1893, Mr. Atkin read a note on *The Treatment of Earache in Children*, advocating "breathing" into the ear by the mother or nurse, and the use of aconite internally. For more severe cases he recommended blisters, etc., and instillations of atropine, morphine, and cocaine.

NORTHUMBERLAND AND DURHAM MEDICAL SOCIETY.—At the meeting held on November 9, 1893, Dr. Hume showed a case in which he had recently trephined for mastoid disease. No abscess had been found in the brain substance, and the lateral sinus was unaffected. Mr. Vickery also showed a case in which the internal jugular vein had been tied for thrombosis in the lateral sinus. It is, perhaps, worthy of note that in both these cases there appear to have been rigors after the operation, but the patients recovered perfectly.

MEDICAL SOCIETY OF LONDON.—At the meeting held on November 27, 1893, Mr. Ballance exhibited a case in which he had cleared out a clotted and pyæmic lateral sinus a month previously. There had been no rigors in this instance, and the recovery had been absolutely uninterrupted.

CLINICAL SOCIETY OF LONDON.—At the meeting held on November 24, Mr. Ballance demonstrated upon a patient the value of Heryng's method of trans-illumination in suspected cases of empyema of the antrum of Highmore.

BRITISH MEDICAL ASSOCIATION—Staffordshire Branch.—At the meeting held on November 30, 1893, Mr. Hatton read a paper on *Intracranial Complications of Chronic Otitis Media*, relating a case.

Oxford and District Branch.—At the meeting held on January 26, 1894, Mr. Victor Horsley gave an address on *Diseases of the Middle Ear and Their Operative Treatment.* The address was illustrated by means of lantern slides, and the steps of the operation of opening the mastoid antrum were demonstrated upon the dead body.

BRITISH MEDICAL ASSOCIATION—North Wales Branch.—At an intermediate meeting of this Branch, held at Wrexham, on April 3, 1894, Mr. Hugh E. Jones, of Liverpool, read a paper on *The Radical Cure of Otorrhœa*, strongly maintaining the importance of thorough clearing out of the tympanic cavity and free drainage. He related two cases, in one of which he had performed Schwartze's operation and in the other Stacke's.

North of England Branch.—At the meeting held at Morpeth on May 3, 1894, Dr. Gowans showed the parts after operation for septic thrombosis of lateral sinus and jugular vein.

BRADFORD MEDICO-CHIRURGICAL SOCIETY.—At a clinical meeting held on Tuesday, December 19, 1893, Mr. Althorp showed a young woman with auricular fistulæ, and at the meeting held on January 9, 1894, he read a paper on the subject, in which he dealt generally with the developmental irregularities met with in that region.

NOTTINGHAM MEDICO-CHIRURGICAL SOCIETY.—At the meeting held on January 17, 1894, Dr. Hunter read a paper for Dr. Stewart on *Eustachian Obstruction.*

ROYAL ACADEMY OF MEDICINE IN IRELAND—SECTION OF ANATOMY.—At the meeting held on January 26, 1894, Dr. H. R. Woods showed a specimen of enlarged turbinated bones which had given rise to nasal obstruction, and which he had removed.

EDINBURGH MEDICO-CHIRURGICAL SOCIETY.—At the meeting held on February 7, 1894, Professor Annandale read a long and elaborate paper on *Intracranial Surgery*, and referred to the connection between intracranial disease and ear troubles. In the discussion which followed, Dr. McBride drew particular attention to this aspect of the question.

SHEFFIELD MEDICO-CHIRURGICAL SOCIETY.—At the meeting held on February 1, 1894, Mr. Arthur Jackson showed a curious fibro-gelatinous naso-pharyngeal polypus which he had removed from a female patient aged twenty-three.

At the meeting on February 15, 1894, Mr. Pye-Smith showed among other specimens, the temporal bone and lungs in a case of septic thrombosis secondary to chronic middle-ear disease in a boy of ten. The patient had been operated upon unsuccessfully.

At the meeting on April 12, 1894, Mr. Pye-Smith showed a brain with purulent meningitis secondary to middle-ear disease.

BRADFORD MEDICO-CHIRURGICAL SOCIETY.—At a meeting held on February 6, 1894, Dr. Adolf Bronner read a paper on *Intracranial Disease Secondary to Ear Disease.* He expressed the opinion that thrombosis was common in adults but rare in children, and that most cases would not require operation if the ear discharge had not at some time been neglected.

At the meeting held on May 1, 1894, Dr. Adolf Bronner showed three cases in which he had operated for mastoid disease. In all the cases there was a history of ear discharge and pain over the affected region, but in none was there any rise in temperature, nor were the periosteum or superficial layers of bone affected, and it was only after chiselling down to a depth of six to ten millimetres that pus or granulation tissue could be found.

EDINBURGH MEDICO-CHIRURGICAL SOCIETY.—The debate upon Intracranial Surgery, opened by Professor Annandale, on February 7, 1894, was continued at the next meeting of the Society, and is well worth reading. The matter was discussed from nearly every possible point of view, and the large number and high professional standing of the speakers considerably enhance the value of the report.

LIVERPOOL MEDICAL INSTITUTION.—At the meeting on February 15, 1894, Mr. Hugh Jones reported a case of subperiosteal abscess following middle-ear mischief, the result of influenza. The patient was operated upon and was apparently doing well, but at the end of three weeks purulent meningitis set in and she died.

CLINICAL SOCIETY OF LONDON.—At the meeting on March 9, 1894, Mr. C. Mansell-Moullin related a case of cerebral abscess which apparently followed a blow over the mastoid. In spite of operation, the patient died, and at the post-mortem a very old encysted abscess was found in the left temporo-sphenoidal lobe, and it was thought that this abscess must have been latent for a long time, and had been roused into activity by the blow. In the discussion which followed, the opinion was expressed that the trocar and canula was a defective instrument for cerebral explorations.

MIDLAND MEDICAL SOCIETY.—At the meeting held on March 28, 1894, Mr. George Heaton showed a boy, aged twelve, who had had symptoms suggestive of the rupture of an intracranial abscess into the right tympanum.

### NEW INVENTIONS.

Dr. Macnaughten Jones has devised an Aural Speculum, in which a hinged clip is attached to the proximal end for the reception of a convex lens, so that a magnified view of the membrane may be readily obtained. The arrangement is figured and described in the *Lancet* of November 18, 1893.

Mr. H. Lake has suggested, and Messrs. F. Walters & Co. have made, a series of Aural Specula, the novelty of which consists in their being made of silvered glass covered with hard rubber, as in the ordinary Ferguson's vaginal specula. They are described in the *British Medical Journal*, of February 3, 1894, where also Messrs. Wright & Co. depict and describe an ingenious Ear Syringe Guard. The object of this invention is to obviate the possibility of accidentally thrusting the nozzle of the syringe too deeply into the meatus, an accident to which one is liable when dealing with very young or very restless patients.

### MISCELLANEOUS.

In the *Lancet* of December 30, 1893, Mr. Lewis G. Glover, of the Victoria Park Hospital records a case of symmetrical herpes attacking the ears of a boy aged fourteen. The patient had had a similar attack in the autumn of each year for the last three or four years.

Mr. Santi contributes to the *Lancet* of January 13, 1894, an interesting paper upon *Hemorrhage following Tonsillotomy*. The paper is for the most part historical, and Mr. Santi, after quoting many authorities, comes to the conclusion that severe hemorrhage is extremely rare.

In the *Lancet* of February 17, 1894, Professor Annandale, of Edinburgh, gives a very clear and lucid account of his method of removal of large naso-pharyngeal polypi. The points upon which he appears to lay particular stress are: (1) Chloroform as the anæsthetic, the head being allowed to hang well over the end of the operating table; (2) the mouth being gagged, the soft palate is divided in the middle line, the flaps being held apart by means of silks previously passed on either side of the uvula; (3) the tumor is separated from its attachments by means of a blunt instrument such as a periosteal elevator, and the neck or pedicle being seized with a strong pair of forceps can readily be removed either through the mouth or through the nose; (4) the nasal cavities are plugged with iodoform gauze, and the halves of the soft palate stitched together.

The account given by Dr. Semon in the *British Medical Journal*, of February 3, 1894, of his personal sufferings under an acute attack of inflammation of the antrum of Highmore has led to other somewhat similar experiences being placed on record. In the *British Medical Journal*, of February, 1894, Dr. M. C. Moxham refers to his own case, and in the issue of the same journal, dated March 31, 1894, Mr. Lennox Browne records a case which had come under his own observation.

It is an extremely happy coincidence that Sir William Dalby's acceptance of the presidential chair of the Medical Society of London should have followed so closely upon the publication of his articles in *Longman's Magazine* on "Medicine as a Career." These articles, which are now issued in book form, are written on the lines of Lord Chesterfield's *Letters*, but are in no way copies or parodies of the latter in anything more than the mere outward form, at the same time they preserve in modern language those amusing touches of shrewdness, common-sense, and humor, which are so characteristic of the original letters.

At the Royal Institution, on Friday evening, March 2, 1894, Dr. McKendrick gave an interesting lecture upon the Cochlea. Dr. McKendrick was inclined to adhere to the older theory of Helmholtz, which assumes a selective action on the part of the organ of Corti, in opposition to the more modern idea that such selection does not occur until the vibrations reach the brain itself. The lecture itself contained, perhaps, rather more technical details than are usually presented to Royal Institution audiences.

At a recent conference of school boards in the northeastern towns, held at Middlesborough, under the elementary Blind and Deaf Children's Act of 1893, it was thought that several small institutions would be preferable to a few large ones.

In the *Lancet*, of April 28, 1894, Mr. W. Gosse, of Sittingbourne, Kent, publishes the details of a case of mastoid disease which had recently come under his care, and in which Mr. Marmaduke Sheild had operated, the patient making a good recovery.

At a recent meeting of the East Sussex Medico-Chirurgical Society, Dr. Stephen Mackenzie read a paper on *Aural Vertigo*, which is published *in extenso* in the *British Medical Journal*, of

May 5, 1894, and which drew from Sir William Dalby a very pertinent criticism in the journal of the following week. It is needless to say that Dr. Mackenzie's paper is an extremely able paper, and will repay perusal. In these days the general physician and the general surgeon are perhaps rather apt to magnify and make much of the knowledge which has accrued to them from the labors of the specialist, but, on the other hand, there is no doubt that the latter will always benefit from looking occasionally at their specialty from the point of view of the former.

Mr. W. J. E. Sumpter, in a letter to the *Lancet*, of May 5, 1894, records the subsequent history of a case referred to by him in the *Lancet*, of April 15, 1893, as being one of epithelioma of both external ears. Operative interference being refused by the patient, the malignant character of the affection became gradually more and more pronounced, and death occurred on January 13, 1894. Post-mortem microscopical examination of the growth left no doubt as to the correctness of the original diagnosis.

The question as to which is the best anæsthetic to use in operations for the removal of adenoid growths is one which has been much discussed of late, and has led to formal debates in two of the societies whose members are more directly concerned, viz.: the Laryngological Society of London and the Society of Anæsthetists. Some laryngologists and some anæsthetists appear to be strongly in favor of using nitrous oxide and ether to induce narcosis in the first instance, maintaining the anæsthesia, if need be, by means of chloroform; on the other hand, probably an equal number were quite as strongly in favor of the employment of chloroform, or mixtures containing chloroform, throughout the operation. These debates and discussions have, however, brought out one very important fact upon which all appear to be agreed, viz.: that the chief risk lies in the anæsthetic, and it is therefore of the utmost importance that the greatest care should be exercised in the choice of a competent and skilled administrator, and that this responsible position should not be filled by one who has not been long accustomed to these cases.

By dividing the blades of a Kramer's aural speculum vertically, shortening them, and attaching a spring to the proximal ends in the manner of a Thudichum's nasal dilator, Dr. W. R. Stewart has provided us with a self-retaining aural speculum, of which he speaks highly in the *British Medical Journal*, of May 5, 1894.

# Obituary.

We regret to announce the death of Dr. SAMUEL JOHNSTONE MOORE, of Blythswood Square, Glasgow, a popular and much respected member of the profession. Among the appointments which he formerly held was that of Physician to the Dispensary for Diseases of the Ear at Glasgow.

M. C. NIEL GRIFFITHS, of Cheltenham, died from the effects of a self-inflicted bullet wound, on March 10, 1894. Mr. Griffiths received his professional education at King's College, London; and at the time of his death held the post of Surgeon to the Throat and Ear Department of the Hospital for Sick Children at Cheltenham He had devoted much time to the study of ear diseases, having held in succession the important posts of Clinical Assistant to the Royal Ear Hospital, Soho; Great Northern Central Hospital; Hospital for Diseases of the Throat, Golden Square; and for some time he was House Surgeon to the London Throat Hospital. His name is associated with a "New Self-Retaining Nasal Speculum and a New Self-Retaining Aural Speculum," shown at the meeting of the British Medical Association in 1891, and with a "Portable Laryngological and Aural Gas Lamp-Stand; and a modified Aural Polypus Snare, and Self-Retaining Nasal Dilator," described in the *British Medical Journal* for the same year (1891).

The duty of recording the death of a fellow-worker is always a painful one, and it becomes doubly so under the sad circumstances referred to above.

The published details connected with the death of a very eminent member of the profession (Dr. E. H. JACOB), at Leeds, on February 27, 1894, afford food for serious reflection on the part of all otologists. Early in January, Dr. Jacob suffered from what is described as "a small abscess in the membrana tympani," but, judging from the fact that opening this abscess was followed by a discharge from the meatus for three weeks and a short period of well marked vertigo, it would almost appear that the whole of the middle ear was more or less involved. Ear symptoms had ceased for a fortnight, when suddenly he was seized with pain in the head and vomiting, and rapidly became comatose. The mastoid and tempero-sphenoidal regions were operated upon, and the cerebellum explored, but no good result ensued, and he never regained consciousness, but died within a few hours. The post-mortem examination showed that death was due to acute diffuse arachnitis, and "no trace of the initial ear disease was to be seen."

We regret to have to record the death of Mr. ARTHUR HENSMAN, F.R C.S., Aural Surgeon to the Middlesex Hospital, and for many years Lecturer on Anatomy at the Middlesex Hospital Medical School. Mr. Hensman died of Bright's disease, on November 1, 1893, at the comparatively early age of fifty-one. He was a native of Northampton, and received his medical education at University College, London, and had held his appointment as Surgeon to the Throat and Ear Department at Middlesex Hospital since the year 1881. In the last edition of Holmes's *System of Surgery*, he contributed to the articles on Diseases of the Larynx, and more recently, in Morris's *Treatises on Anatomy*, he wrote the sections upon the Thorax, the Upper Part of the Digestive Tract, and the Larynx.

VOL. XXIII. No. 4.

ARCHIVES OF OTOLOGY.

# PRIMARY DISEASE OF THE BONY LABYRINTHINE CAPSULE.

BY PROF. ADAM POLITZER, OF VIENNA.

Translated by Dr. J. A. SPALDING, Portland, Me.

(*With eight figures in the text.*)

THE topic of the following article will be a hitherto erroneously diagnosticated form of disease of the ear, which, beginning with symptoms of progressive loss of hearing, generally terminates in incurable deafness.

Owing to its clinical course, this disease has previously been tabulated in the group of chronic dry catarrhs of the middle ear, the so-called sclerosis of the middle-ear mucosa. A series of observations of a clinical nature, made in late years, from cases that later came to the post-mortem table, show, without a shadow of doubt, that in a considerable number, which, from their clinical symptoms and their usual course, we are inclined to attribute to chronic middle-ear catarrhal disease, the anatomico-pathological foundation for the loss of hearing is not to be sought for in a disease of the mucosa at all, but *in a primary affection of the bony labyrinthine capsule.*

A number of exceedingly deaf persons in whom, according to the observation of friends, the loss of hearing had been slowly progressive, exhibited, *post mortem, in the region of the niche of the oval window,* more or less sharp *bony protuberances,* which were set off from the neighboring district by their pale yellow or curiously reddish tint.

These protuberances, mostly covered *with normal mucosa,* were the size of a pea, and extended into the normal tissue through flattish edges. They were most pronounced in front of the niche, though sometimes behind, whilst once they surrounded it entirely, so that the niche was contracted and appeared flat. Several specimens exhibited an elevated promontory, and both labyrinthine windows were considerably contracted.

The mucosa of the middle ear was generally normal, rarely thickened, or gray, and occasionally interrupted with niches and excavations.

The stapes was almost invariably immovable, its body thickened, its side pieces roughened, and once the whole ossicle was transformed into a solid mass of bone.

The histological investigation shows that the affection here consists in *a circumscribed disease of the bony labyrinthine capsule*, as a result of which we have neoplastic bony tissue, which gradually pushes aside the normal bone, and, attacking the oval window and stapes, closes *in toto* the oval window, and produces anchylosis of the stapes. Occasionally the greater portion of the capsule is affected by the disease, as a result of which the neoplastic tissue also extends toward the round window, and toward the cavity of the labyrinth.

The number of cases observed alive, and then examined after death, was sixteen, varying from the ages of 50 to 88. Most of them were totally deaf, some very deaf. It was only in the latter, who could understand a loud voice close to the ear, that the *negative result of Rinné's test* could be established. Exceptionally, the perception for low tones was lost by aërial conduction, whilst the shrill tones of Galton's whistle were often perceived up to the highest limits by those who were not very deaf. Bone-conduction for a loud-ticking watch was observed in but a single case.

The *Mt* appeared, as is generally the case in the aged, dull, thickened, opalescent, often very milky and atrophic.

The *development* of the excessive deafness dated mostly from many years back, bearing much resemblance to the cases usually entitled *dry catarrh of the middle ear* (sclerosis). But any accuracy in regard to the history of the case or duration of the deafness was excluded, owing to the varieties of replies obtained from the patients.

The chief characteristic of the cases was the constant and *vehement tinnitus*. In some the tinnitus had ceased with the arrival of the total deafness, in others it persisted without intermission. *Sensations of pain* were occasionally complained of, resembling a pricking or tearing within the ear. Heaviness, dulness of the head, loss of memory, occasional vertigo could not be connected with the aural affection, because all of these symptoms could equally well be referred to the advanced ages of the patients, in connection with nervous symptoms.

The *cause* of the affection could not be discovered in any case with accuracy, owing to the low intelligence of the patients. Two of these suffered from gout, but whether in any of the patients syphilis had any causation in the deafness could not be decided.

There is no doubt that pathological alterations in the capsule of the labyrinth, similar to those observed in this series of cases, may be developed subsequent to syphilis, as the observations of Gradenigo show (International Medical Congress in Rome, 1893). I also have no doubt that heredity may play an occasional rôle in these cases of loss of hearing.

## HISTORICAL NOTES.

Toynbee's catalogue (London, 1857) contains several specimens which apparently belong to the group of primary disease of the labyrinthine capsule. Among these we observe a thickening and ivory-like condition of the anchylosed plate of the stapes (No. 494), a similar alteration of the bone adjoining the oval window (No. 539), and an ivory-like mass originating from the labyrinthine wall (No. 575).

Moos has described[1] a case belonging to this group. A man of forty-seven who had been growing gradually deaf for eighteen years, became extremely deaf after erysipelas, and totally deaf during confinement in prison. The post-mortem examination revealed anchylosis of the stapes on both sides, from neoplastic ossification, with contraction of the *internal* meatus auditorius. Moos remarks, that this condition is entirely different from that of the ordinary chronic inflammation of the *Mt* since there are no alterations in the mucous membrane of the tympanic cavity.

---

[1] *Archiv f. Ohr.*, Band ii., 1867.

The second edition of my text-book on the ear (page 233), contains some remarks on anchylosis of the stapes due to the deposit of newly formed bony tissue on the inner surface of the stapes and the region of the oval window. In this case we find a prominent bony ridge, flattening off towards the plate of the stapes. The same page contains the sketch (the first *histological* observation of stapedial anchylosis) of a horizontal section through the stapes and oval window of a woman of forty-eight, deaf for eighteen years, with total synostosis of the stapes with the oval window. The sketch shows the same alterations as those which I have since discovered to be characteristic of primary disease of the labyrinthine capsule as a whole. In the third edition of my text-book I have mentioned on page 239, three cases of severe deafness with the same set of microscopic appearances.

Katz[1] describes synostosis of the stapes with the oval window in a very deaf woman of thirty-nine. He thinks that it is due to an arthritic diathesis, but from the description I see no reason why the case does not belong to the group now under discussion.

Then again, Habermann, in Schwartze's *system* (page 249) mentions a similar condition in a man of fifty-eight, who had been gradually losing his hearing for thirty years. The exostosis seems to Habermann to be an extension of the inflammation from the tympanic mucous membrane to the bone, but all of the drawings appended to the paper satisfy me that here is still another case of primary inflammation of the capsule surrounding the labyrinth.

The various microscopic preparations which I have made have been verified by Prof. Weichselbaum, and exhibited to a private party of aurists in Boston as well as to the members of the Pan-American Medical Congress in 1893.

Finally I will mention an incident case by Bezold and Scheibe[2] concerning a woman of sixty-five who had been deaf for thirty-five years, with bony anchylosis between the pelvis ovalis and the plate of the stapes. This was due to inflammation of the bone about the plate of the stapes, which, if not in the bone itself, originated probably from the periosteum of the inside of the oval window.

---

[1] *Deutsche med. Wochensch.*, No. 40, 1890.

[2] *Zeitsch. f. Ohr.*, Band xxiv., 1893, and these ARCH., vol. xxiii., p. 48.

Before depicting the most typical cases of the entire list, I will say that the specimens obtained in the freshest possible condition were subjected to the action of alcohol and chromic acid, and then gradually decalcified according to Vlakovic's method in a solution of nitric acid and salt.

I shall describe only the most instructive and typical cases with histological alterations.

Franziska, Z., æt seventy-seven, with progressive deafness of many years' standing, but shortly before her death could understand words spoken loudly and directly into her ears. No perception of the audiometer by bone-conduction, no low tones, but high tones nearly to the top of the scale.

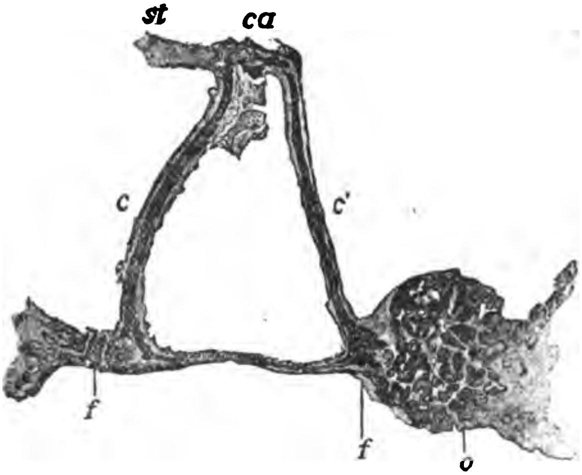


FIG. I.

Section through the stapes and oval window of a woman of seventy-seven extremely deaf. *ca* = Head of the stapes. *c c* = Crura of the stapes. *st* = Tendon of the stapedius muscle. *f* = Ligament. orbiculare of the stapes, at the posterior section of the oval window. *f'* = Anterior portion of the same, altered in structure. *o* = Neoplastic bony mass in the labyrinthine capsule.

We observe the labyrinthine capsule bounding the anterior section of the oval window supplied by a round sharply-defined formation of bone (*o*), which is set off from the adjoining normal bony substance by the enlargement of the bony spaces and of the Haversian canals, as well as by the darker stain. The enlarged spaces contain thin-walled vessels and delicate fibrillæ of connective tissue. In some sections the anterior portion of the orbicular ligament is completely pushed aside by the bony mass arising from the labyrinthine wall, whilst in other sections (*f'*) the altered ligament is not entirely lost in the bony mass. The anterior section of the ligament is normal. The mucosa appears normal everywhere. Here, then, we have a partial anchylosis of the stapes with the oval window which explains why the patient could still hear words spoken directly into the ear.

Mrs. W., has been very deaf for many years ; æt. eighty-six. Autopsy shows no alterations in the mucosa of tympanum, or *Mt.* Right stapes immovable in the oval window.

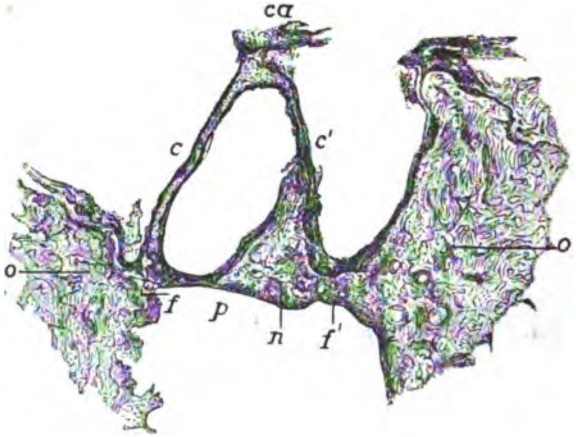


FIG. 2.

Section through the stapes and oval window of the right ear. *ca* = Head of stapes. *c c'* = Crura of stapes. *p* = Foot of stapes. *o o'* = Neoplastic bony formation in the labyrinthine capsule. *f'* = Synostosis of the plate of stapes and capsule. *n* = Neoplastic bone proliferating from the labyrinthine capsule toward the stapes.

The section shows a bony mass starting from the capsule, sharply defined from the normal tissue, interspersed with enlarged bone cavities and going toward the stapes, pushing aside the ligament, attacking the anterior half of the plate, and filling the angle formed by the plate and the anterior crus. The anterior portion of the ligament is not ossified.

Mrs. A., aged seventy-five, deaf many years. Macroscopically we see on the promontory, near the oval window, a reddish-yellow projecting bony mass, which extends from the window to the Fallopian canal, and is well defined by its color from the pale yellow background of the promontory. These alterations are more pronounced in the left ear.

The microscopic examination of the right ear shows :

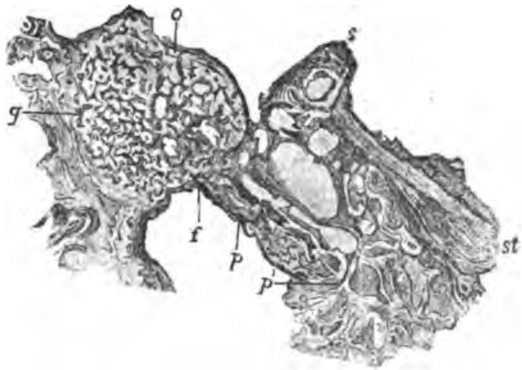


FIG. 3.

Section through the stapes and oval window. *s* = Head of stapes. *st*= Stapedius muscle. *P'* = Vestibular surface of the thickened plate of the stapes. *P* = Posterior margin of the plate not connected with the window. *o* = Neoplastic bone tissue filled with vessels, and affecting the entire labyrinthine wall. *g* = Border between the bony neoplasm and the normal bony tissue of the labyrinthine capsule. *f* = Synostosis between the plate of the stapes and the neoplastic bone.

The sections show *a sharply defined neoplastic bony formation* with increased thickness of the labyrinthine wall. The anterior portion of the growth is extremely vascular, which may explain its blight tint. The neoplasm attacks, as it did in the previous case, the plate of the stapes, so that in the anterior section of the oval window the stapes ligament has partly disappeared. The plate of the stapes is thickened and altered in structure.

This condition of things explains to my satisfaction those cases in which through the transparent *Mt* we see the very reddish promontory wall. These are characterized by progressive deafness, and generally terminate in total loss of hearing.

Here, too, in such cases, dependent, as I think, largely on heredity, we observe a negative result of Rinné's test, diminished perception for the audiometer and watch, and after prolonged loss of hearing abbreviated perception by bone-conduction for the middle tones of the fork, ($c^3$).

The clinical course of these cases, resisting all medication, justifies us in believing that these are cases of the above-described disease of the capsule, in which the hyperæmia of the promontory so plainly visible to the eye must be regarded as a symptom of corresponding hyperæmia of the bony labyrinthine capsule. Further investigations may confirm this view.

Katharina B., æt. seventy-five, progressively deaf, and at last totally deaf. Stapes anchylosed by hyperostosis of the walls of the oval niche. The microscope shows the alterations depicted in Fig. 4.

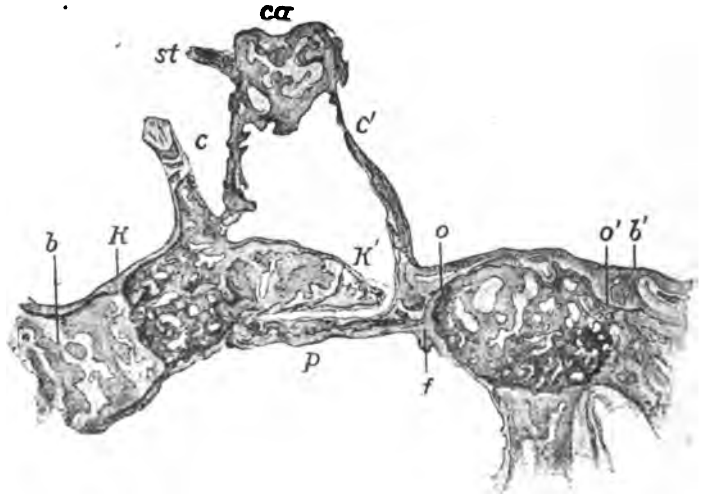


FIG. 4.

Section of the left stapes and oval window. *ca* = Head of stapes. *c c'* = Crura of the stapes. *st* = Stapedius muscle. *p* = Base of stapes. *o o'* = Sharply defined bony formation in the anterior portion of the labyrinthine capsule near the oval window. *b b'* = Normal bone of the capsule. *f* = Synostosis of the plate of stapes and window. *k k'* = Neoplastic bone tissue in the posterior segment of the oval window, proliferating over the external surface of the plate of the stapes.

The anterior segment of the capsule shows a well-defined bony island which has already pushed aside the stapedio-vestibular articulation and is irregularly interspersed with enlarged bone spaces. A similar structure extending into the niche *has overgrown the external surface of the plate.* Mucous membranes normal.

This condition of affairs is important in considering the form of disease now under discussion, since it offers proof that the affection arises from the capsule, and that the bony neoplasm not only attacks the plate of the stapes but proliferates upon its outer surface.

Marie B. was long treated for tinnitus and progressive deafness. Was totally deaf for the last year of her life.

The autopsy revealed anchylosis of the stapes.

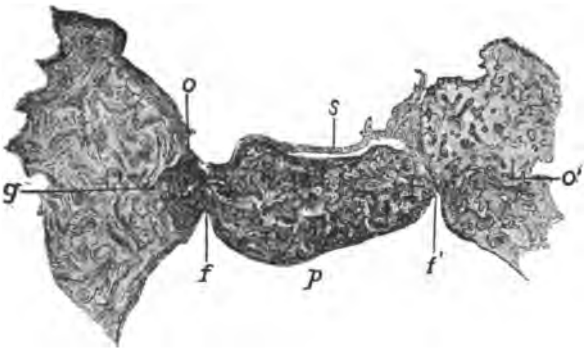


FIG. 5.

Horizontal section through the plate of the stapes and oval window of the right ear. *f p f′* = Irregularly thickened plate of the stapes. *f f′* = Region of the stapes ligament. *o o′* = Neoplastic bony mass in the capsule. *g* = Border between the neoplastic and normal bone of the capsule. *s* = Mucosa of the lateral surface of the plate of the stapes.

This section shows an irregular thickening (to about four- or fivefold) of the plate of the stapes, due to bony formation. The stapedio-vestibular articulation is destroyed in a like manner. That portion of the capsular wall adjacent to the oval window is only partially affected by the neoplasm, which is sharply defined from the normal tissues. At the posterior segment of the window the bone disease extends into the capsule. The left ear shows similar changes, only the capsule is more affected, whilst the bone cells contain vessels, giant-cells, and osteoblasts.

Simon M., aged eighty-six, has been totally deaf for forty years, the loss of hearing beginning after typhus. No perception of sound by aërial or bone-conduction.

Macroscopically there are no alterations in *Mt.*

Niche of the oval window filled with a bony mass and flattened. The round window is also closed with bone and only suggested by an indentation.

Microscopic sections through the labyrinth show extensive disease of the capsule, embracing almost all of the bony tissue which is interspersed with numerous cavities.

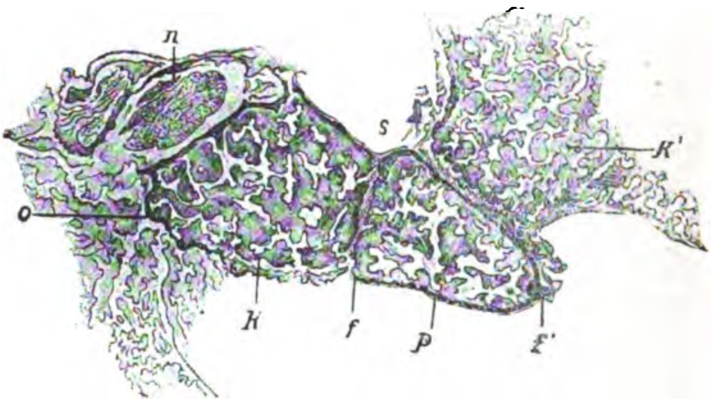


FIG. 6.

Section of the left oval window. *p* = Former plate of stapes. *f f'* Region of the former ligament of the stapes. *f s f'* = Wedge-shaped neoplastic bone, filling the niche of the oval window. *o k k'* = Neoplastic bone in the labyrinthine capsule. *n* = Facial nerve.

The figure explains itself, yet we may add that the niche of the oval window is occupied by a wedge-like bone which is at spots differentiated from the bone of the capsule by a layer of connective tissue, but is connected on the opposite side with the neoplastic bony tissue of the capsule without any sharp definition. The wedge is to be regarded as a neoplasm extending from the capsule toward the niche and destroying the stapes in toto.

The round window is obliterated by newly formed bone which extends into the inferior convolution of the cochlea as far as the lower surface of the lamina spiralis, so that the scala tympani is destroyed. The ganglionic canal and the auditory nerve are also affected.

Theresa D., aged seventy-three, gradual deafness since 1880; death in 1891; previously totally deaf; much tinnitus. Rinné's test negative in the left ear, indefinite in the right. No perception of speech in either ear.

*Right ear.—Autopsy:* Promontory injected, stapes immovable, and inner portion of the crus of the stapes surrounded with hard mass of bone. The microscopic conditions are shown in Fig 7.

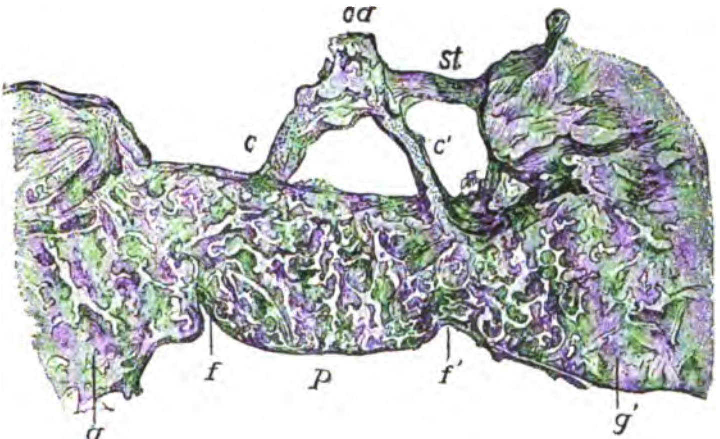


FIG. 7.

Section through the oval window and stapes of right ear. *f f'* = Former boundary of the oval window. *p* = The bony neoplasm filling the window. *g g'* = Pathological bony substance of the labyrinthine capsule. *c c'* = Crura of the stapes. *ca* = Head of the stapes. *st* = Tendon of the stapedius muscle.

The oval window is closed by a neoplasm extending without demarcation into the pathologically altered capsule. The limit of the plate of the stapes is hinted in the indentations f f'. The plate and inner part of each crus have been lost in the mass of neoplastic bone, the rest of the stapes as seen at c' extends directly into the bone. The latter shows the characteristic marks of excessive enlargement of the bony spaces and Haversian canals, with connective tissue and thin vessels. The alterations in the bone are present throughout the capsule.

The microscopical changes on the right side are seen in Fig. 8.

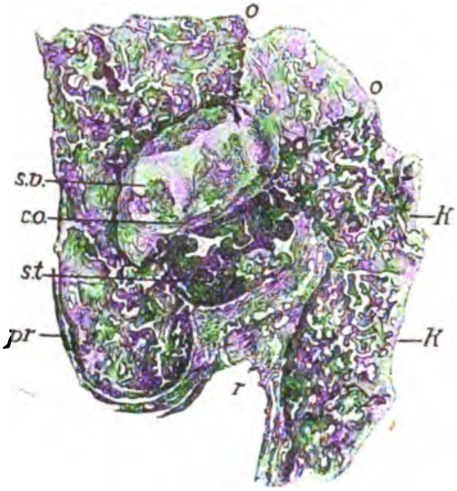


FIG. 8.

Frontal section through the promontory, round window, and the lower cochlear convolution of the left ear of the same person. *p r* = Promontory. *r* = Connective-tissue·neoplasm in the niche of the round window. *k k'* = Pathologically altered bony tissue in the lower segment of the cochlea corresponding to the modiolus. *o o'* Slightly altered bony island in the modiolus. *s.t.* = Bony proliferation filling the scala tympani. *s.v.* = Scala vestibuli. *c.o.* = Lamina spiralis membranacea with Corti's organ.

In addition to closure of the oval window and destruction of the stapes as in the right ear we see further alterations in the left ear. Here the bone has extended into the deeper portions of the labyrinth. Only a small portion of the scala vestibuli remains normal, as at o o'. The mucosa of the round window is thickened. The scala tympani is filled with a neoplastic bony mass connected with the capsule extending to the lower surface of the lamina spiralis ossea and membranacea, and pushing aside the triangular ligament. The two laminæ and Huschke's teeth are normal, but Corti's organ is irrecognizable.

*A brief review* shows us now that the bony tissue of the capsule forming the surrounding of the oval window is changed into a neoplastic bony substance, which is more deeply stained than the normal bone. The variation in color is so marked that it can be seen with the naked eye. Moreover, there are more bone corpuscles and larger bone spaces in the pathological portions than in the normal bone.

The spaces are filled with cells, connective-tissue, and blood-vessels. If the bony neoplasm is young, the spaces are occupied by numerous vessels filled with blood corpuscles. If the neoplastic tissue is older the vessels are there, but empty. A few specimens showed giant-cells, osteoblasts, and osteoclasts.

These observations ought to suffice to show, that in a considerable number of cases which we generally call sclerosis of the middle-ear mucosa, the pathological alterations leading to anchylosis of the stapes do not lie in the mucous membrane at all, but in a primary disease of the capsule of the labyrinth. The proof that the disturbance of nutrition in the bone does not originate in the periosteal or mucous layer, depends on the absence of any alterations in the mucous membrane of the middle ear, as well as on the circumstance that the most remarkable alterations in the bony tissue, the enlargement of the bone spaces, etc., are not discovered near the mucous membrane but in the deeper layers of the capsule itself. In point of fact, in two very recent cases, I found *isolated* diseased lacunæ of bone in the promontory wall near the inner meatus and the cochlea. Moreover, the extension of the process toward the medial portion of the capsule and the internal meatus suggest a primary affection of the bone, since a bone disease extending so deeply into the petrous bone could scarcely arise from disturbances of nutrition of the mucous membrane of the middle ear. If inflammatory processes in the mucosa of the middle ear could excite such alterations in the bony walls of the tympanum as we have here described them, we ought very often to find a morbid condition in the labyrinthine capsule in cases of *non-suppurative chronic middle-ear catarrhs with hypertrophy and thickening of the middle-ear mucosa.* This is, however, rarely the case in the adhesive processes arising from the secretory catarrhs, and it is questionable whether, in the few instances in which the bone disease together with thickening of the mucous membrane in the window niches has been observed, it was to be regarded as the cause of the bone affection, or as a combination of the two processes.

Most of these cases were in old people, but clinical observations also show that the same disease may produce severe deafness in the young, and that this form, which, owing to its pregnant anatomical character, must be differentiated *from the group of the middle-ear catarrhs*, occurs more frequently than one might feel justified in assuming from the few anatomical reports that have so far been made.

It is well known that other entirely different forms of disease occur with the same progressive deafness, such as calcification and ossification of the stapedio-vestibular ligament, adhesion of the crura of the stapes to the walls of the niche of the oval window, thickening of the mucosa of the membrane of the round window, alterations which have long since been recognized as the sequelæ of chronic middle-ear catarrh. Therefore it will be the task of the future to diagnosticate between the two forms during life. The catarrhal adhesive processes are more favorable in a prognostic point of view, than the form of labyrinthine diseases here described. But even now, from the combination of certain symptoms, we can diagnosticate a labyrinthine disease. Thus we have the insidious character of the deafness, without the slightest token of a preceding catarrhal disease of the middle ear, normal or but slightly retracted *Mt*, visible redness of the promontory wall, normal permeable Eustachian tubes, negative result of Rinné's test, and an hereditary predisposition.

All treatment must be regarded as nearly hopeless. Indeed, we find in the depicted conditions a satisfactory explanation why, in certain forms of progressive deafness, our therapeutical efforts remain without result, and why, in certain forms of disease, entitled dry middle-ear catarrh, the disturbance of hearing advances incessantly in spite of energetic local treatment. Despite the great advances in the treatment of ear diseases in later days we are, face to face with these processes, as powerless as ever, and in consideration of the conditions in the bone, I almost doubt if we shall ever succeed in hindering the alterations in the labyrinth, and terminating the disturbances of hearing therewith connected.

Nevertheless, considering the benefit often obtained from the internal use of iodide of potassium, or iodine, in various diseases of the bones, I would urge that instead of any local treatment we should resort to the energetic exhibition of one or the other of these remedies, internally. It is clear, of course, that in a case of *advanced* neoplastic formation of bone in the labyrinthine capsule even the preparations of iodine will be of no avail, but there is a chance that where the affection is in the initiatory stages the long-continued use of these remedies, occasionally interrupted to relieve the digestive organs, might at the worst prevent too rapid an advance of the unavoidable evil. One gram daily in divided doses for ten to fourteen days, at intervals of a month or two, repeated for a year or more, would be a proper trial in this direction.

In several cases of late in which I diagnosticated neoplastic inflammation in the capsule from the progressive deafness, the reddish reflection of the promontory, the patent tube, and the negative Rinné's test, I have limited the treatment to the use of the iodides exclusively, and the results have been satisfactory where the deafness had not reached a high degree, in that there was no increase of the difficulty.

There is hardly need of my mentioning that this method of treatment is more sure to be of avail in the incipient stages of the disease than where the deafness is already excessive in degree. But further observations will decide the exact value of the iodides in the treatment of this hitherto incurable affection.

In reply to the suggestion that the operative treatment of this disease might be useful, I would say that the hopes excited in late years by the proposed operations on the ossicles have not been fulfilled, since continued observations have shown that the final results have been mostly unfavorable. It is plain that in cases like these under discussion the stapes could only be extracted before ossification had taken place. If the stapes once becomes fixed in the oval window, the operation will be impossible, because the crura of the stapes will fracture upon the slightest traction. But even in those cases in which an early extraction might be followed by a direct improvement in hearing, we could not calculate on a permanent success. For, having seen that the neoplastic bone formation proliferates toward the plate of the stapes and oval window, and even overlaps the plate from the outside (Fig. 4), it is doubtful whether the early extraction of the stapes could obviate the advance of the bone into the capsule, and the final closure of the oval window. In this point of view Blake's communications at the International Congress in Rome in 1893, in which a noticeable decrease of hearing followed extraction of the stapes in twenty-two cases, are of much interest and weight.

# A CONTRIBUTION TO THE SYMPTOMATOLOGY OF RHINITIS CHRONICA ATROPHICA, WITH SPECIAL REFERENCE TO THE AFFECTIONS OF THE EARS.

BY DR. J. MORF, OF WINTERTHUR.

Translated by Dr. J. A. SPALDING, Portland, Me.

THE atrophic form of chronic nasal catarrh, despite the numerous treatises that have been written about it, is by no means finished and laid aside. If we look over the abundant literature bearing upon the topic, we find a long list of controversial points, not only concerning the anatomical and pathological alterations of the interior of the nose, but concerning the causation and symptoms. Opinions vary enormously, especially concerning the first two points, and it is not at all rare, to see the very same morbid appearance regarded by one author as a cause of the disease, held by another as a symptom of the morbid process, or as a collateral complication. The various forms of post-nasal catarrh were early recognized by many authors, so far as regards their relation to the diseases of the ear, particular mention being made of v. Troeltsch,[30] and Wendt,[33] * but it was Zaufal[37] who especially insisted on the dependence upon ozæna of ear disease. He says: "It is very instructive to observe how affections of the ear, in a very widespread disease, ozæna, depend upon the anatomical and pathological peculiarities of the nasal cavities"; and then adds that he has met some ear disease in about eighty per cent. of all of his cases of ozæna. Further details on the same

---

* Compare the bibliography at the end of the article.—TRANS.

connection between ozæna and the ear can be found in Wyss's dissertation at Berne University[24] to which we will later turn our attention.

Jurasz[18] asserts that he has seen the ear affected twelve times in 170 cases of ozæna. On the other hand, C. Michel[19] doubts any connection of the sort. "Rarely," says he, "have I ever seen a patient suffering with ozæna affected with an ear disease. I once saw a single case of progressive deafness, and occasionally chronic cases of ordinary middle-ear inflammation."

In this state of doubt, I have thought it worth while to exhibit the possible connection in this point of view in the last eighty patients with ozæna at the Basle Otological clinique in the year 1891.

I make no separation between the cases of fœtid or non-fœtid ozæna at this point, for the anatomical alterations, the subjective and the objective symptoms, excepting the fœtor, are common to both forms, and besides that, those cases in which there was no odor at first, might develop that symptom at a later date. Moreover, the line between the two can never be accurately drawn, as one commingles with the other as Jurasz has emphasized. Schech[25] also insists that even if every case of ozæna is not fœtid, yet it is so in all of the well developed cases.

Of our 80 patients, 28 were male and 52 were female. The proportion was, therefore, 35 and 65 per cent. respectively, figures which agree with the general view that ozæna is chiefly a disease of the female sex, as Voltolini amongst others long since asserted.

Contrarily we observe that out of 85 patients seen by C. Michel, 45 were women. This divergence of opinion and percentages may depend on the fact that Michel regards suppuration of the nostrils and the accessory nasal cavities a *sine qua non* in his diagnosis of ozæna, and in this point of view, as Jurasz, Siebenmann[15] and Killian[14] have shown, the sexes are about equally divided. For this reason I have excluded all simple cases of pure suppuration from the accessory nasal cavities.

The age of our patients varied from ten to sixty, the large majority being from ten to thirty, so that young persons' are more likely to be affected with ozæna than the elderly. The frequency decreases rapidly after the age of thirty. The youngest patient was eight, the oldest sixty. Still we must not forget that although there are but few patients under ten, we have no means of knowing precisely when the disease begins.

The most formidable symptom in 72 of our patients out of 80 was the odor, in most cases recognizable at a distance. But the amount of the odor does not always depend on the amount of secretion, which, in the form of pus, greenish-yellow crusts of the nostrils, attaches itself to the posterior wall of the pharynx, and even of the larynx and trachea, for in the eight patients without any fœtor, there was an abundance of crusts.

A single patient assured us that she never had any fœtor except in summer.

The most important alteration is the atrophy which varies in extent and intensity in every patient. If one patient exhibits but slight atrophy of the mucosa of the nostrils, another will show enormous enlargement of the nostrils, and loss of the turbinates, so that they look like mere projections, and one can see, through the enlarged cavities, the posterior pharyngeal space and the openings into the Eustachian tubes without the aid of any apparatus. Moreover, the presence of hypertrophy of the mucous membrane is by no means a rarity, being observed in 18 cases out of our 80. The middle turbinated bone is much more often affected with this form of the disease than either of the others. Four times we saw large mucous polypi hanging from the mucosa of the middle turbinates.

I will emphasize this occurrence of atrophy and of hypertrophy of the mucous membranes in the same individual, because it is denied by some authorities in these diseases. Jurasz found it eight times in 139 persons, whilst Fraenkel,[9] Schech, and Zuckerkandl[10] speak of the frequent transition of moderate hyperplastic nasal catarrh into the atrophic form. In our cases of this combination of hypertrophy of the middle turbinates with atrophy of the rest of the mucosa there was, in all probability, as recent experience has shown us, suppuration from the accessory cavities of the nose, so that the hypertrophy originated from this latter condition.

We have seen but a single case of *unilateral* rhinitis atrophica, and accompanied with disease of the corresponding ear, a symptom first observed by Zaufal, and cited by him as proof that the aural affection must be regarded as a sequel of the rhinitis and propagated through the tube.

The sense of smell was reduced in 47 cases out of 80, and extended from slight defect to total loss of the sense.

Nearly one half of the patients complained of headache, 33 of them of ache in the forehead, 4 in the occiput, and one in the upper part of the neck. One patient suffered from severe supraorbital neuralgia. Almost always the headache was associated with a sense of vertigo.

Many patients complained of habitual thirst, frequent epistaxis. In the note-books we find frequent mention of sunken broad noses, delicate constitution, anæmia, and indistinct and nasal speech.

Pharyngitis sicca is a constant associate of atrophic rhinitis. It was generally limited in most of our patients to the retro-nasal portion of the pharynx, but occasionally extended to the oral portion. In ten cases the symptom extended into the larynx, and in two into the trachea. In one of the latter cases the thick crusts occasionally obstructed the glottis to such an extent as to produce attacks of stridulous breathing and even of suffocation. Where the larynx was affected, the vocal cords generally exhibited anomalies in tension and in closure.

Deviation of the septum was seen seven times, eczema of the nostrils four, disease of the lachrymal canal twice, and opacities of the cornea twice. Examinations of the visual field showed nothing abnormal. Three patients were affected with hereditary or tertiary syphilis, and thrice a tubercular condition of the lungs was diagnosticated.

Among the complications of rhinitis the diseases of the ear occupy a very prominent position, and special attention was given to them at our clinique. And wherever ocular inspection failed to give a satisfactory diagnosis of the seat of the disease, an exact functional examination was made. The ears were found affected (excluding of course those of the external ear and auricle because they do not depend on rhinitis atrophica), in 44 patients, which is 55 per cent. of the whole. But if we exclude those in which the *Mt* was not precisely normal, but in which the hearing was intact, we have 38 aural patients out of 80, which is 45 per cent.

Buerkner[6] has calculated that about 30 per cent. of our population do not hear perfectly, and about 40 per cent. have some disease of the ear. If we compare now our 80 patients with rhinitis, we find 47 per cent. are deaf, or a higher percentage than shown by Buerkner on the average. And if we added those who suffered from diseases of the external ear the increase would be still greater, showing a plus of 20 per cent. above the average, when persons suffer from rhinitis atrophica.

Jurasz found but 8 per cent. of aural affections in ozæna, but he counted only those with tubal catarrh and otitis media with or without perforation of the *Mt.* Wyss saw 15 deaf patients out of 60 ozæna cases, and 32 with pathological alterations of the ear without deafness, so that his figures are lower than Buerkner's and Zaufal's, since the latter calculates on 80 per cent. of deafness in rhinitis.

Further investigation shows that as patients with rhinitis atrophica grow older they grow more and more deaf, so that in the third and fourth decades of life almost all the rhinitic patients are also deaf.

The aural disease was located 20 times in one ear, 15 in the right and 5 in the left, and 18 times in both ears. The right ear was consequently affected 3 times as often as the left.

Zaufal having observed that in unilateral disease the corresponding ear was affected, or where both nostrils were affected the ear on that side with greater nasal disease was the most affected with deafness, we might be inclined to think, that in our patients the right nostril was more often affected than the left, but such a distinction we were totally unable to maintain.

Furthermore, Löwenberg has shown that unilateral deafness in men is oftener in the left ear, and in women in the right. From which as 14 of our cases were men and 24 women, we ought to meet with more deafness on the right side than on the left, as has actually occurred.

Division of the ear affections in our patients showed disease of the inner ear in 8, and of the middle ear in 30, which shows an average above the ordinary run of private and clinical cases as established by Bezold, so that we have some justification in referring this *plus* to the rhinitic complication.

If we agree with Zaufal in attributing the aural affection to the closure or irritation of the pharyngeal orifice of the tube by the rhinitic discharges, we have support in our statistics, the tubal orifice being often affected and the other difficulties in the ear being easily due to extension of a tubal inflammation into the middle ear.

If tubal closure is somewhat rare in our cases, it may be due to the disease having proceeded farther into the tube and so disappeared and assumed another form. The reason why we may thus think is, that the frequency of perforations of the *Mt* and of Shrapnell's membrane prove that there has been, previous to the perforation, some disease of the tube, as Bezold[2] has abundantly proved.

We must also emphasize the frequence of nervous deafness (8 cases out of 80, nearly double the amount in comparison with the statistics of other observers). Nevertheless this may be partially accounted for by the variations of the definition of nervous deafness as employed by different observers. If our percentages are correct, we must ascribe to the rhinitis, as well as to the nervous deafness, some constitutional ætiology, such as syphilis, tuberculosis, or infectious diseases which affect alike the nose and the inner ear.

A general review of the whole subject shows:

That chronic atrophic nasal catarrh attacks chiefly young people.

That women are more often affected than men.

That the secretion in 90 per cent. of the cases is fœtid.

That a unilateral disease is extremely rare.

That where the middle turbinates are hypertrophied or covered with mucous polypi, the case is complicated with suppuration from the accessory nasal cavities.

That the naso-pharyngeal mucosa is often affected, and that of the larynx and trachea much more rarely.

That the eyes are rarely affected.

That disease of the middle and inner ear is a frequent complication.

That the middle ear is four times as often affected as the inner ear.

That pathological alterations in the *Mt* without deafness are rare.

That the sex has no influence on the frequency of the aural affection, in general, but that the right ear is oftener affected in women, and the left in men.

That in about one half of the cases of aural complications, both ears are attacked, and in another half only one ear. In the latter circumstance the corresponding half of the nose is more diseased than the other.

That nervous deafness is relatively more frequent in atrophic rhinitis, despite the fact that most of the patients are relatively young.

That the middle-ear disease is generally the consequence of disturbed tubal ventilation, and that the affection of the inner ear must be referred to constitutional anomalies.

## *Literary References to Ozæna.*

1. Berliner, M.: "Ueber Ozaena und ihre Behandlung." *Deutsch. med. Wochensch.*, 1889, No. 51.

2. Bezold: "Statist. Bericht. ü. die in den Jahren 1884 to 1886 behandelten Ohrenkrankheiten." *Archiv f. Ohrenhlkde.*, Band xxv. *Cholesteatoma. Perforat. Memb. Shrapn.*, Wiesbaden, 1889.

3. Bresgen, M.: "Einige interressante Faelle," etc. *Deutsch. m. W.*, 1876, No. 27.

————: *Der chron. Nasen- und Rachencatarrh*, IIte Auf., 1883.

4. Bruegelmann, W.: "Ueber das Wesen und die Behandlung der Ozaena." *Monatssch. f. Ohrenhlkde.*, 1884, No. 5.

5. Buerkner: "Ueber die Statistik der Ohrenkr." *Wien. kl. Wochensch.*, 1890, No. 39.

6. Fraenkel, B.: "Allgem. Diagnost. u. Therap. d. Krankheit. d. Nase," etc. *Von Ziemssen's Handbuch d. spec. Path. u. Therap.*, iv., 1.

7. Gottstein: "Nasenkrankheiten." *Eulenburg's Encyclop.*, ix.

————: "Ueber verschiedene Formen von Rhinitis." *Berlin. m. Wochensch.*, 1884, No. 4.

8. Gruenwald: *Die Lehre v. d. Naseneiterungen*, 1893.

9. Habermann: "Zur path. Anat. d. Ozaena." *Zeitsch. f. Heilkde.*, Band iii., 1886.

10. Herzog: "Der foet. chron. Nasencatarrh." *Wien. med. Presse*, 1881, No. 29.

11. Hopmann: "Zusammenhang. d. Nasen- u. Augenaffectionen." *Deutsch. med. Wochensch.*, 1885, No. 25.

12. Hyrtl: "Angeb. Mangel. d. unt. Nasenmuschel." *Sitzungen. d. k. k. Acad. i. Wien*, Band xxxviii.

13. Jurasz, A.: *Die Krankheit. d. ob. Luftwege.*

14. Killian: "Meine Erfahrungen ü. d. Kieferhöhleneiterungen." *Muench. med. Wochensch.*, Nr. 4 und folg. 1892.

15. Kuchenbecker: "Beitrag z. Aetiologie und Therap. d. Empyaema d. Ant. Highmor." *Monatsch. f. Ohrenhlkde.*, xxvi.

16. Krieg: "Ueber Emphysema d. Antr. Highmor." *Wuert. Corresp. Blatt*, Nos. 34 and 35, 1888.

17. Loewenberg: "Natur. u. Behand. d. Ozaena." *Deutsch. med. Wochensch.*, 1885, Nos. 1 and 2.

18. Mackenzie: "Die krankheiten d. Halses u. d. Nase." *Deutsch von Semon*, in 1884.

19. Michel, C.: *Die Krankheiten d. Nasenhoehle u. d. Nasenrachenraum*, 1876.

20. Moldenhauer: *Die Kranheiten. d. Nasenhoehle u. ihrer Nebehoehlen*, etc., 1886.

21. Moure: "Atrophische Coryza." *Gaz. des Hôpitaux*, 3 and 10, July, 1888.

22. Rosenberg, M.: "Ueber Ozaena." *Dissert.*, Berlin, 1880.

23. Rosenthal, T.: *Die Erkrankungen d. Nase*, 1882.

24. Schaeffer: "Ozaena." *Monatssch. f. Ohrenhlkde.*, 1881, No. 4.

25. Schech: *Die Krankheiten d. Mundhoehle*, 1892.

26. Schondorff: "Ueber. d. chron. atroph. foet. Nasencatarrh." *Deutsch. med. Wochensch.*, 1884, No. 2.

27. Schuchardt: "Ueber das Wesen d. Ozaena." *Archiv f. kl. Chirurg.*, xxxix., 1, 1889.

28. Schwartze: *Handbuch d. Ohrenhlkde.*, 1892.

29. Seifert: "Ueber Rhinitis Atrophica. Int." *Centralbl. f. Laryngologie*, vii., 169.

30. V. Troeltsch: *Ohrenhlkde.*

31. Valentin: "Ueber. chron. Schnupfen u. Ozaena." *Corresp.-Blatt f. Schweizer Aertste*, 1887, No. 5.

32. Voltolini: *Die Krankheiten d. Nase u. d. Nasenrachenraums*, 1888.

33. Wendt: "Die Krankheiten d. Nasenhoehle," etc. *V. Ziemssen's Handbuch d. spec. Path. u. Therap.*, vii., 1.

34. Wyss: "Étude clinique des complicat. auric. d. l'ozæna. *Dissert.*, Geneva, 1886.

35. Ziem: "Ueber Blennorrhœa d. Nase." *Monatssch. f. Ohrenhlkde.*, 1880, No. 4.

36. *Zuckerkandl: Normal. u. Patholog. Anatomie d. Nasenhoehle*, Band v. and vi., 1893.

37. Zaufal: *Ueber d. allgem. Verwendbarkeit d. kalten Drahtschlings*, 1878.

# ON MONAURAL DIPLACUSIS.

By Prof. G. GRADENIGO, Turin.

Translated by Dr. Ward A. Holden.

DIPLACUSIS or double hearing is not a particular form of disease, but a symptom that may be found with pathological conditions of the ear. We distinguish between binaural and monaural diplacusis; in the binaural, each ear perceives the tone differently and it seems doubled; in the monaural, which is much rarer, a double perception of a single tone is got by one ear alone.

Binaural diplacusis may be divided into (1) *Disharmonic diplacusis*, which is characterized by the fact that the interval is small between the objective tone perceived by one ear and the false tone perceived by the other, it being only a half- or a third-tone. The false tone may be higher or lower than the other. This symptom is found particularly with the perception of tones of the middle register. In thirteen cases reported exactly and in detail in the literature, the false tone as related to the objective tone was:

½ to 1 tone lower, 3 times.
½ to 1 tone higher, 7 times.
½ to 2 tones higher, 2 times.
⅓ tone lower for high tones, and
⅓ tone higher for low tones, once.

This form occurs with slight alterations of the internal ear, which may accompany acute or relapsing chronic processes in the middle ear, or which may be the beginning of true inflammation of the internal ear.

(2) *Harmonic diplacusis*, in which the interval between the objective and the falsely perceived tone is harmonic, being an octave, a fourth, a fifth, or a sixth, above or below the objective tone. In this form the actual difference in the perception of the two ears is not in the tone but in the timbre, one or more harmonics being perceived with greater intensity than the fundamental tone. This form of diplacusis is usually absent when the hearing is tested by bone conduction. The cause of the intensification of the harmonics simulating a different tone, lies in the middle ear, and depends, in all probability, either upon a modification in the vibration of the conducting apparatus, due to cicatrices, partial atrophy of the tympanic membrane, changes in the tension of the muscle, etc., or upon peculiarities of resonance in the tympanic and neighboring cavities. The internal ear is usually intact. In this category are the cases of Treitel, Spalding, and two observed by me.

With both forms of diplacusis there may be associated *binaural echoic diplacusis*, a condition in which the perception of the objective and of the false tone seems separated by an interval of time. One of my patients who suffered with disharmonic diplacusis stated that he received the impression that would be got if two persons spoke the same word in different tones at the same time.

Monaural diplacusis has not been treated in literature, and since I have had the opportunity of observing two cases of this sort, one being in an educated musician, I wish to report them briefly. This form is analogous to binaural harmonic diplacusis. The affected ear perceives not only the fundamental tone, but, particularly when the fundamental is not intense, one of the harmonics also, so that in the one ear there is a doubled and synchronous perception of sound. This phenomenon, like the analogous binaural diplacusis, depends, probably, upon anomalies of the conducting apparatus, or peculiarities of tympanic resonance.

W., male, æt. twenty-nine, a violinist and composer, has catarrhal otitis media in the left ear and in a milder form in the right also, with retraction and atrophic patches in both tympanic membranes. There are no symptoms pointing to disease of the internal ear. D. V. left; hearing almost normal, right. On both sides, but more markedly on the left, the following phenomenon may be made out. When a fork of middle or higher register is held before the ear, the tone is heard single, so long as its intensity is great; but as the intensity diminishes a second tone is clearly heard, which is usually harmonic and represents a higher or lower major or minor third or quarter. The interval varies with different fundamentals, but is constant for the same tone. This phenomenon is also obtainable by bone-conduction. Besides the diplacusis I found the physiological condition described by Urbantschitsch well marked, namely, that a given tone seems lower as it is more intense and higher as it grows weaker. Thus the tone $g^3$ which was heard normal for forty-five seconds by the right ear, seemed more than a half-tone higher as its intensity diminished. This was not the case with lower tones.

A second analagous case was observed in a woman of twenty-eight with catarrhal otitis media on both sides, without marked changes in the tympanic membrane, and with involvement of the internal ear. The forks $c^3$, $c^4$, and $c^5$ were heard double in the last ten seconds before the perception ceased. The patient, who was not musical, could not give the interval between the true tone and the false, but it was harmonic. It is not impossible that this form of monaural harmonic diplacusis may depend upon exaggerated physiological conditions, whereby with the excitation of the percipient elements corresponding to the fundamental tone there is associated the excitation of other groups of elements that stand in some relation with the first, such as customary consonance. Such a diffusion of the excitation might take place in the labyrinth, or as in the case of colored hearing, in the cerebral centres.

# ON DOUBLE HEARING.

By Dr. HANS DAAE,

FIRST ASSISTANT IN THE CLINIC FOR DISEASES OF THE EAR AND NOSE, GOVERNMENT HOSPITAL, CHRISTIANIA, NORWAY.

Translated by Dr. A. B. Kibbe, Seattle, Washington.

THAT functional disturbance is known as double hearing which consists of hearing a single tone double. The two tones differ from one another either in time (diplacusis echotica) or in place (interval), and according as the interval is harmonic or discordant we speak of " diplacusis harmonica " or " disharmonica." From time to time cases of double hearing have been reported, and occasionally a discussion has arisen on this symptom. That is, the probable explanation of the disease has been discussed in that a few believe that the double hearing is to be attributed to changes in the middle ear, others to the internal ear, while there are still some who ascribe it to central disturbances, each of these three explanations being supported by clinical observation. As examples may be cited : For an exclusively middle-ear affection Treitel's second case,[1] in which the double hearing arose from a rupture of the membrana tympani and disappeared when the rupture healed. As an exclusively internal-ear affection Treitel's first case,[2] where fatigue of the percipient organ followed long-continued use of the telephone. For a more centrally located cause Swan Burnett's case may be mentioned.

In addition to these a large number of other cases have been described, of which a few clearly depend on middle-ear disease, though even here internal-ear affection can scarcely be excluded. On the contrary, in the majority of these cases, disturbances in the perceptive organs may be pointed out as the accompanying and even most essential symptoms existing along with double hearing. Lastly, a few cases have been described of a very puzzling kind, as well with reference to the symptoms as to the location of the affection. Van Selm's[1] case, for instance, is so complicated that one cannot be certain whether it is an ordinary diplacusis binaüralis or not.

---

[1] *Archiv für Ohrenheilkunde*, xxxii., p. 218.

[2] *Archiv für Ohrenheilkunde*, xxxii., p. 217.

It is stated that the tuning-fork C by bone-conduction was perceived as two tones "of which one was deeper and weaker, the other higher and stronger." The patient alleged that the higher tone corresponded to C. In addition, by bone-conduction A was heard in the right ear as two tones, a high, normal, a deep pseudo tone; the left ear was similarly affected. The same applied to C occasionally. This points to a form of diplacusis monauralis, even if it be not identical with a symptom described by Gradenigo under the same name.[2] Strangely enough it will be observed in Swan Burnett's case that bone-conduction gave a double tone, and yet the diagnosis of a central affection was made. On the whole, there appears unfortunately to be too little complete material available to locate exactly the seat of the disease which manifests itself by the symptom of double hearing.

The diagnosis of the seat of ear diseases, whether in the sound-conducting or sound-perceiving apparatus, is commonly difficult and often the result of an estimate of probabilities. Still more difficult is it to decide whether double hearing is to be localized in either the former or the latter mentioned apparatus. Also if for example the majority of the symptoms necessitate the diagnosis of middle-ear disease it is still not certain that double hearing present on both sides is to be taken as dependent on middle-ear disease. This symptom may quite easily depend on a secondary change of the perceiving apparatus similar to other well-known symptoms of internal-ear disease in connection with catarrhal affections of the middle ear.

---

[1] Zur Casuistic des Doppelthörens, *Inaug. Dissertation*, 1889. See the preceding number of this volume.

[2] *Zeitschrift für Ohrenheilkunde*, xxiii., p. 251, 1892.

If, therefore, in a given case when from the majority of the symptoms the diagnosis of a middle-ear affection has been established, double hearing by air-conduction is found so that the healthy ear perceives the correct tone and the affected ear the false one, but double hearing by bone-conduction is absent, one is justified in attributing the double hearing to an affection of the sound-conducting apparatus.

In the previously described cases this examination was either not made, or, if so, sufficient attention was not paid to it. The diagnosis in consequence was made from other symptoms entirely. It is safe to conclude, therefore, from the previous cases, that the diseases of the middle ear may be diagnosed with certainty even though the symptoms of diplacusis appear to be present as a consequence of a simultaneous affection of the perception apparatus.

The question therefore arises whether middle-ear disease alone can cause double hearing. According to my ideas this is possible, as well from the fact that cases are recorded in literature which substantiate this, and I myself have observed several such instances.

D. T., thirty-two years of age. Two years ago he fell on the ice. A few drops of blood flowed from left ear, and at the same time giddiness and deafness set in with a strong high-pitched hissing with now and then a sound like the chirping of a grasshopper. These symptoms gradually disappeared. Since this fall he has been unable to tolerate music, especially wind instruments. The left ear perceived the tones as a scratching of metallic substances against one another, and though he heard the tones at the same time they were lower than in the right ear. If music is faint he hears it pure. His appreciation for music is fairly good. The left drumhead presents nothing abnormal excepting slight retraction with peripheric shortening of the light spot; especially was there no cicatrix to be discovered. The right drumhead was quite normal.

| | watch | whisper | Weber | Rinné | Galton |
|---|---|---|---|---|---|
| R | normal | normal | 256 | +50 | 10–0.9 |
| L | ⅛ *m* | 6.5 | indiff. | +50 | 10–1.0 |

Treatment: multiple incision in the central slightly relaxed portion of the left drumhead. Patient afterward disappeared. Six months later he returned and stated that the singing did not annoy him so severely as before the punctures. Examination with the tuning-fork showed tones to be perceived equally in both ears by bone-conduction. By air-conduction, on the contrary, the vibrations below 100 were scarcely heard. From 100 to 4096 the tones were heard a fifth lower in the left than in the right ear. 4096 was not heard as a tone but "as a whistle going through the head."

Galton 10–0.9 right; 10–1 left.

Treatment: catheterization and air douche.

After four treatments he recovered completely. Music was heard, though not perfectly; occasionally some discord, as he imagined. Otherwise he perceived the tone slightly weaker on the left than on the right side. At the same time a change in the interval from a fifth to one half tone took place. Other symptoms were the same as in the previous examination. Recovery permanent.

Here we find diplacusis by air- but not by bone-conduction. Treitel's case II, as evidence that double hearing may depend on middle-ear disease, does not appear to me unquestionable. Among other things there is no support for the diagnosis in the shape of an examination with the tuning-fork.

What change it is in the middle ear which in my previously described cases has given rise to double hearing I do not know, nor has it been demonstrated in the majority of the published instances of middle-ear affections with double hearing. The retracted drumhead, however, the altered relations of resonance, and above all the moderately certain existence of diminished mobility in the sound-conducting apparatus may well indicate the origin of double hearing.

It appears questionable to me whether the restricted mobility may not alone be sufficient, for exactly in these cases does middle-ear massage appear most agreeable and useful.

The changes in the perceptive apparatus which should produce double hearing have already been declared to be according to Helmholtz's theory dependent on either increased relaxation or tension of the fibres of the membrana basilaris. This explanation, however, is not always sufficient. For instance, I have observed a case in which Helmholtz's theory was insufficient, Voltolini's, on the contrary, seeming to be more appropriate.

Mr. M. In the course of a few years a constantly decreasing power of hearing in the right ear had occurred following a chronic middle-ear catarrh. At the present time he hears almost nothing.

In the left ear he had had a catarrhal affection which disappeared after a time under treatment with the air douche.

Double hearing was discovered quite accidentally at the examination, it having never annoyed him. In the right ear he hears beating noises which he pointed out on the piano as *f*. In addition he has coarse pulsating hissing and occasionally fine whistling. These sounds are stronger in the recumbent than in the erect position. No giddiness or headache. Now and then radiating pains in the right ear. The drumhead of the right ear gave the impression of a chronic catarrhal affection of the tympanic cavity.

| | watch | whisper | Weber | Rinné | Galton |
|---|---|---|---|---|---|
| R | 0 | 10 *cm* | | +8 | 10–1 |
| L | normal | normal | indiff. | +30 | 10–1 |

By bone-conduction the fork is heard equally on both sides. Through the air, however, the relations are different in that tones of 60–128 are perceived correctly and with equal intensity in both ears. From 128–2048 the tones are perceived on the left side as one and the same tone, namely, f′, that is, the subjective tone. Above 2048 the tones are correctly heard and on both sides alike.

The left ear becomes fatigued more quickly than the right. A few days later he was examined anew without being treated. The conditions were as at first, excepting that neither 2048 nor 4096 could be heard on the left side ; those below and Galton's whistle, on the contrary, being well perceived. Unfortunately I had no opportunity to treat him, as he became confined to bed from other diseases and died later on.

As stated, Voltolini's theory seems to be more applicable to this case. According to his theory, each tone excites all fibres of the membrana basilaris, but one fibre, that appropriate to the given tone, more than the others. In my case it appeared as though fibre *f* was the most irritable and dominant one, owing to the weak impression made on it by other tones than *f*. The localization of double hearing in the middle or internal ear respectively, according to the presence of harmony or discord, as proposed by Gradenigo, is difficult to defend, as long as the boundary line between harmony and discord is so inexact. In addition, it is apparent that in harmonic, as well as in discordant double hearing, bone-conduction points sometimes to middle, at other times to internal, ear affection. Equally may we have at the same time discordant double hearing in one part, and harmonic in another part of the scale.

In this connection permit me to report a very interesting case:

A. J., assistant, sixty-one years of age. During the past five years the hearing in the left ear has gradually decreased, being worse after taking cold. Three years ago he was treated by a specialist with the air douche, following which he was better for about six months.

Other symptoms during the five years were:

1. Giddiness, particularly during a noise. A wagon rolling noisily by caused a tendency to fall to the left.

2. Continued hissing like escaping steam, accompanied by numerous tones, principally high, though some very deep, which he felt like a vibration deep in the ear, almost as if a vibrating tuning-fork were being moved to and fro in front of the meatus. The vibrations were 280 per minute (pulse 84).

3. Autophony occasionally on the left side.

4. In addition a cracking in the left ear in swallowing.

*Status præsens.* The left drumhead bears evidence of a chronic catarrhal affection. In addition there is a chronic nasal catarrh with hypertrophy of the mucus membrane.

| R | watch | whisper | Weber | Rinné | Galton |
|---|---|---|---|---|---|
| | 0.5 *m* | 11 *m* | 256 | +45 | 10–1.3 |
| L | ad conch. | 1.5 *m* | r (as c′) | +25 | 10–1.3 |

By bone conduction 2 tones are heard; a stronger one in the sound ear, a weaker in the diseased one. If the tuning-fork is carried 1 *cm* from the sagittal suture toward the affected side, it is heard strongest in the diseased ear. The tone which is heard by the sound ear is the correct one for all tuning-forks. He hears it on the affected side 2½ tones lower than its actual pitch. Forks from 64 to 4096 vibrations were correctly perceived by the right ear, while in the left those of from 64 to 2048 vibrations were perceived 2½ tones, and from 2048 to 4096 3½ tones lower.

Here we see diplacusis binauralis disharmonica, but the disharmonic interval varies for different tones. In spite of the fact that the double hearing here presumably depended on an affection of the perceptive organs, treatment was directed to the chronic middle-ear catarrh. After a few treatments by the air douche the interval nearly disappeared, in that

from 64–100 there was a difference of ½ a tone,
from 128–256 of 1 tone,
and from 526–4096 no difference.

This was interesting from the fact that the interval decreased with the height of the tones; which was opposite to that which was the case in the first examination.

The treatment was continued eight days longer, when examination showed that double hearing had returned. Tones of 64 to 100 gave a difference of 1½ tones, therefore a discord. From 128 to 4096 there were 3 tones difference, the interval being harmonic.

After being twice treated with vapor of sal ammoniac the perception in the deep octaves was uncertain—

$c'$ (256) being perceived as $g^{\#}$ (discord),
$c''$ (512) as *a* (harmony).

After each treatment the interval decreased, and eight days later had entirely disappeared; single hearing existing, which was retained in spite of the fact that, later, hearing in the left ear decreased. Occasionally he has been treated with Delstanche's rarefier, which "relieves" him markedly. This case is interesting as showing clearly the impossibility of localizing discordant and harmonic double hearing, as Gradenigo asserts, in affections of the tone-perceiving and tone-conducting apparatus, respectively. In addition, double hearing existing as well by bone- as by air-conduction makes the case noteworthy.

It is probable that the double hearing in this instance, as well as many other symptoms, must be referred to the perceptive apparatus. In this locality, however, most of the symptoms are secondary, and depend on chronic middle-ear trouble. Especially is this likely to be the case with the double hearing, as it disappeared when treatment was directed to the middle ear.

The results at which I have arrived by including reported cases with those which I have observed are that double hearing may arise:

1. From affections of the sound-conducting apparatus.
2. From affections of the sound-perceiving apparatus.
3. That in a few cases where double hearing has been declared to depend on affections of the perceiving apparatus, the real affection was in the middle ear, treatment of which would have caused the double hearing to diminish or disappear.
4. That harmonic as well as discordant double hearing may depend partly on affections of the inner, partly on affections of the middle ear.

# HEARING FOR SPEECH AND HEARING FOR TONES IN GENERAL, AND THE MEASUREMENT OF THE LATTER BY GRADENIGO'S AUDITORY FIELD.

BY DR. H. ZWAARDEMAKER, OF UTRECHT.

Translated by Dr. A. B. KIBBE, Seattle, Washington.

IF in this short article we contrast hearing for speech and hearing for tones, this does not happen because we imagine a distinction between speech and tones in an acoustic sense. We need not make the fact particularly prominent that we too think of speech as composed of tones and noises which approach us in characteristic association and varying order. We shall even go a step further and assume that, physiologically speaking, tones and noises may be mixed together, in that both, analyzed in Corti's organ, are perceived by the same nerve endings.

If we take the stand defended by Exner, Brücke,[1] and Gad,[2] the tones of our music as well as the tones and noises of speech are all without exception analyzed and perceived by similar sensory elements.

It is the fibres of the membrana basilaris which are caused to vibrate in unison, and it is the terminals of the ramus cochleæ which are irritated by these fibres. A functional disturbance which decreases the sensibility of the ear for tones must therefore diminish the sensibility for speech, provided that the disturbance is connected with those elements concerned with the appreciation of the tones and noises of speech. It often occurs, however, that the decrease for speech is more marked than that for tones. This may be the case even if it can be shown that it is just those tones which are comprised within the limits of speech that have remained intact. As a consequence the disturbance must not be attributed to the perception of the component elementary impressions, but the difficulty must rest in their sequence and rapid change of intensity and pitch. It appears very important to collect further experiences on this point, and I have therefore looked about for methods to estimate as simply and completely as possible in all cases of ear disease the decrease in hearing for speech as well as for the scale of tones.

---

[1] E. Brücke: "Über die Wahrnehmung der Geräusche," *Sitzungsberichte der K. Academie der Wissenschaften zu Wien, math.-naturw.-Kl.*, Band lxxxx., S. 199, 1884.

[2] J. Gad in Schwartze's *Handbuch der Ohrenheilk.*, 1 Bd., S. 351.

For speech this task seems very simple. In his method of applying conversational or whispered speech as a measure of the acuteness of hearing, Oscar Wolf has given us a means as easy as it is certain of estimating the sensibility of the ear for both of these. In America the use of a fraction to designate the results obtained was recommended long ago. The denominator denotes the distance at which normal individuals hear the sound. For whispered speech this is estimated by Wolf at 18 *m*, according to military requirements at 23 *m*. The numerator denotes the distance at which the person examined actually hears the sound. It is questionable whether one is justified in assuming as normal so great a distance, which only applies to very excellent ears. The normal standard, according to anthropometric requirements, is not the maximum value, but rather that which exists in the majority. A second and far more important objection is that the fraction form of estimation implies that the sensitiveness of the ear is inversely proportionate to the distance.

Apparently this is not the case. Natural philosophy teaches us that the intensity of sound decreases in inverse ratio to the square of the distance. The theoretic conditions which must be fulfilled if this law is to hold good, are seldom realized in nature, in our rooms never. For first the ground is quite near the ear as well as to the source of sound. The sound waves, therefore, are able to spread only from the floor upward. Downward they strike the floor and according to its conditions are only more or less incompletely reflected. In addition there are the walls and ceilings of the room, which act in a similar way. If the floor is covered with carpet, the waves are but feebly reflected, and the same occurs if many instruments and pieces of furniture are placed in the vicinity. It is no wonder therefore that practically sound does not decrease in inverse ratio to the square of the distance, but rather in simple proportion. Under these circumstances it is really impossible to find a simple relation, and one applicable to all places between sound intensity and distance. Our error is less if we assume for our rooms a simple inverse ratio, than if we apply the theoretical law. The description, therefore, by aid of a fraction is, *cum grano salis*, correct.

Without question it is practical in estimating the auditory acuteness for whispered speech to make use of the fraction, and to use as denominator of the same Wolf's normal distance of 18 *m*. It is necessary to always be aware that many inaccuracies are included in this form. These are, however, presumably less than the uncertainty which exists in the estimation of the acuteness of hearing by whisper or speech in general, for not only does the intensity with which the whisper is made vary, but the carrying distance of the latter changes considerably with the choice of words, as the author of the method, O. Wolf, indicated in his first publication (*Sprache und Ohr*, Braunschweig, 1871). An effort was made, as is known, to avoid this difficulty by making note of the words used at the examination. It is plain that then a comparison is only permissible between estimates which have been made with identical series of words, which again introduces psychological sources of error.

In short, by using the fractional form according to custom, we obtain an approximate measure of the acuteness of hearing for whispered speech. In our examinations we shall make use of this method, though we can only give a provisional value to the results so obtained.

A. Goldschieder and R. F. Müller have lately written an excellent article on the physiology of reading.[1] It was shown that we always sacrifice certainty to rapidity. We never analyze exactly the written characters, but rather grasp a few characteristic strokes and compare these with memory pictures. If the similarity between both seems to be sufficient, we take them to be identical and pass on to other characters. We do not halt at each letter, but choose a few which appear particularly prominent in the word. These we assemble at a glance and complete the word from memory. In this way reading progresses rapidly, but the danger of error is very great.

In the same way we act with hearing. From the vowels and consonants which compose a word we seize upon a few determinating sounds and noises. On these fragmentary impressions we attempt to rest our memory pictures, and, if in keeping with sense, we believe we have understood the word. From this cause arise the mistakes which we daily hear our patients make. Determinating sounds are probably first the vowels and second the easily heard consonants. Among the vowels there are again some which through their intensity are particularly prominent, and, as it appears to me, they are those in which the mouth is most widely opened; above all stands *a* (as in *far*). We make the least demands upon our patients therefore in testing them with whispered speech, if we choose words in which the greatest possible number and of most clearly determinating sounds are present. In this way we shall seek to estimate the acuteness of hearing for speech in every case.

The estimation of the acuteness of hearing for tones does not seem at first sight equally difficult. We do not need to learn the acuteness for individual tones, as Lucae does with his tuning-fork with a mechanical striker, or for a certain sound as does Politzer with his absolute acumeter, but rather desire to know the acuteness of hearing for all tones of the scale. It is apparent that we shall not have to carry out such estimates for all tones of the ordinary chromatic scale. We shall always be obliged to restrict ourselves to a few points in the scale, in such a way that we can presume on finding the interlying steps by interpolation. Hartmann for example has chosen for this purpose the note at the beginning of the octave c, c$^1$, c$^2$, c$^3$, c$^4$. Gradenigo has added C and c$^5$. Late researches, however, through which the upper and the lower part of the scale have become of such great importance, necessitate for the completion of the series in addition to the estimation of the upper and lower limits C$-2$, C$-1$, C, c, c$^1$, c$^2$, c$^3$, c$^4$, c$^5$, c$^6$—that is, not less than twelve measurements. This is exceedingly complicated and requires too much from the patience of those examined. For certain scientific examinations this tedious measurement cannot be avoided. For practical purposes, however, it is necessary to simplify the method.

---

[1] *Zeitschrift für klinische Medicin*, Bd. xxiii., S. 1 und 2.

I arrived at this purpose by dividing the scale into four equal parts which present the advantage of being natural tone groups.

1. The zone of contra octaves.
2. The chest register of the singing voice.
3. The zone of the vowels.
4. The zone of the high guttural consonants.

Each of these zones or groups of tones, which possess a close relationship with one another, may permissibly be studied separately in another manner. Concerning the upper and lower zone we shall be informed during the aural examination by aid of forks, rods, and the Galton whistle; the second may be tested with a harmonium; and finally concerning the third we have in the whispered voice a very exact criterion. We thus get a general idea of the character of the different parts of the scale and need to establish but few actual measurements in order to be able to form a correct quantitative representation. It is obvious that these should be made at the dividing and terminal points of the zone. Therefore measurements were taken at

1. The lower boundary tone.
2. C.
3. c$^2$.
4. f$^{\sharp 4}$.
5. The upper boundary tone.

The previous examination having given us a general view of the more or less continuous character of the function within the zone itself, it is possible by aid of the quantities now found to construct a curve which will represent the acuteness of hearing for all tones.

This curve, in fact, gives such a representation, provided that the sensory acuteness is equal for the various tones, in other words, that there are no so-called tone gaps. In the majority of the cases examined this proviso will suffice. Should it not, we still always have the Hartmann-Gradenigo method and Bezold's examination of the continuous-tone series. I felt forced to adopt the simplified method, because in the construction of a curve for all cases examined in the Polyclinic, a great scientific gain was to be found, *for in the relative area of the space inclosed between the curve and the axis of abscissas is found a simple positive denotation of the acuteness of hearing for tones in general.*

Gradenigo has given this space a particular name. He calls it the "auditory field." After we have fully determined its upper and lower limits, Gradenigo's auditory field is an actual measure for tone-hearing in general. The question now arises as to the manner of estimating the sensory acuteness for the selected points of the scale. The upper and lower limits are decided upon by the previously given method[1]; the lower boundary, by aid of tuning-forks and Appunn's lamellæ,[2] latterly also and by preference with Moos's iron forks; the upper limit calls for the Galton whistle. We seek to produce the boundary tones as pure, but at the same time as even and as strong as possible. In the vicinity of the upper and lower tone-limits the sensitiveness of the ear becomes progressively less. Beyond the boundary tone the acuteness of hearing is zero.

The three other points of the curve, for which we chose c, $c^2$, and $f\#^4$, are only accessible for measurement if tuning-forks or the wide organ pipes are used. All other sources of tone give compound and not simple vibrations and compound tones are to be absolutely excluded in our examinations. Of the two sources of tone I prefer the tuning-fork.

---

[1] *Zeitschrift f. Ohrenheilkunde*, Bd. xxiv. S., 280. Translation, ARCH. OF OTOL., 1894, p. 228.

[2] *Arch. f. Ohrenheilkunde*, Bd., xxxv., S. 299.

In order to produce a constant stroke, the fork is supplied with Lucae's hammer; we are thus in a position to give to it the same initial amplitude at all times, and the hammer always strikes with the same amount of living force against the same point of the tine. There is therefore nothing to prevent using the time of hearing as a measure of acuteness of hearing. It is only necessary to hold the fork freely in the hand so as to permit its vibrations to die out always in the same way.

The amplitude of the stroke applied to the tuning-fork is the measure of the intensity of sound which is evoked from the fork at that moment. To estimate the acuteness of hearing it is only necessary to bring the fork quite near the ear and note the instant that the tone is no longer heard.

If at this moment the amplitude of the vibration is known, we know also the acuteness of hearing for the respective tone.

Concerning the manner in which the results of such measurements should be compared with one another, opinions differ. Jacobson believes that the actual acuteness of hearing under these conditions is inversely proportionate to the square of the amplitude. Hartmann, on the contrary, prefers a simple inverse proportion, and later cites in support an experimental examination of Stefanini.[1] However that may be, for the present, as far as I can see, we shall do better to follow the customary opinions and, until we have been taught better, presume that the physical intensity of tones is proportionate to the square of their amplitudes. In this manner we arrive at a fairly simple expression of the relations between two given estimates of hearing.

In this form of observations it is quite important to proceed always in the same manner. Sufficient time should be allowed the patient to fix his attention on the weak tone of the fork; on the other hand, fatigue of the ear should be avoided. We have always made the test by carrying the fork to the ear and waiting until the patient clearly appreciated the tone. The fork is then removed and in the next instant again brought in the vicinity of the ear. In this way we proceed slowly until told by the patient that the tone is no longer heard. From the instant perception ceases to the time when we are so told, a certain time elapses which, from lack of practice on the patient's part, may be relatively great. This may, however, be greatly diminished by repeated testing. If the estimate must be made without forks supplied with a springing hammer, Gradenigo's plan may find place. He recommends in Schwartze's *Handbook* not to measure the hearing-time of a patient, but rather the time which the normal ear hears the fork after the diseased ear has ceased hearing. By subtraction the real hearing-time is found, and one is freed from the irregularities due to striking the fork with the hand.

---

[1] Stefanini, cited in *Beiblättern zu Wiedemann's Annalen*, 1888, S. 320, and 1889, S. 871.

In whatever way the fork is used, overtones are to be avoided. In the fork $f^{\#4}$ these cause but little disturbance, as at this point they are much more weakly heard than the fundamental tone. The hearing-time for the normal ear we have set at 17 seconds. With C the overtones are, on the contrary, often stronger than the fundamental tone, and their suppression is very difficult. I succeeded, however, by the use of cloth rings as dampers, 10 *cm* in length, which were shoved over the ends of the tines (the latter were 30 *cm* long on my fork). In order that no overtones should be heard, it is necessary to shove the cloth casing forward a little (on my fork they extend inward 2½ *cm*).

The hammer, 25 *cm* in length, strikes immediately below the cloth ring. In this way a perfectly pure, deep humming is produced, which is heard by a normal ear for a little less than 100 seconds, and which, by aid of the graphic method, was estimated to be a tone of 64 vibrations. The $c^2$ fork was dampened by a cloth ring 2½ *cm* in length, placed at the foot of the tines, and gives a normal hearing-time of 60 seconds. In histories of cases I always denote the duration of hearing in seconds.

As stated, the ultimate purpose of our method is to obtain a curve which shall show the acuteness of hearing for all tones of the scale. To construct this curve, I first calculate the duration of hearing in percentages, according to Hartmann, and make the squares of the latter the ordinates of a system of co-ordinates. This latter will be most practically constructed if the tones of our chromatic scale are placed on the axis of abscissas, and in addition are arranged like the key-board of the piano, the lower tones to the left, the higher to the right. If for each half tone we calculate 1 *mm* we get, for the entire scale in youth which reaches from $E^{-3}$ to $E^{7}$, 132 *mm*. At five points on these axes of abscissas, ordinates are erected for the purpose of constructing our curve. The extreme upper and lower ones are *per se* zero, as the acuteness of hearing for the boundary tones approach the zero point. On the three middle ordinates at C, $c^{3}$, and $f\sharp^{4}$, the squares of Hartmann's percentages are measured, which is most easily done by setting off as many *mm* as there are hundredths. Through the five points so acquired a curve is drawn which will show a comparatively regular course with but one point of maximum. At one time this maximum point will be found more to the left, at another to the right, and frequently in the middle. The figure so constructed is very similar to that of Hartmann, but differs from it in several important points. First the upper and lower parts of the scale have been added to it. Second, not the hearing times, but the squares of the latter, have been set down. In this way we approximate more closely to the physical conditions as at present understood. Third, I have abandoned the step form, because in all such constructions we conceive of a continuous change of function, and there is no objection to representing the matter as we conceive it. A graphic representation could scarcely have any other object.

The whole scale of 11 octaves forms the base lines of our figure. A youthful person having normal hearing would possess, in the Hartmann sense, 100 per cent. of acuteness of hearing. His entire acuteness of hearing, therefore, would be represented by the product of the complete scale and an ordinate height of 100 per cent. (squared) which for our figure gives an area of 132 square *cm*. This area is the geometric expression for the field of acuteness of hearing of a child. Late in life 8 half tones are lost at the lower end of the scale, and 7 at the upper end.

To the right and left a part of the figure is wanting, and the base lines retain a length of only 117 *mm.* On this account the acuteness of an elderly person's hearing would be measured by an area of 117 square *cm.* Between both extremes lies the value for the acuteness of hearing in the various periods of life. The tables below show this for each year of life.

The figures of this table form a normal value, with which the results of measurements of hearing in pathological cases are to be compared. The normal figures are not, however, comparable with one another.

| Age. | Lower Limit. | Upper Limit. | Normal Loss Below. | Normal Loss Above. | Normal Auditory Field in Square *cm.* |
|---|---|---|---|---|---|
| 4 | $e^{-8}$ | $f^7$ | — | — | — |
| 5 | " | $f^7$—¼ tone | — | — | — |
| 6 | " | " " | — | — | — |
| 7 | " | $e^7$ | — | — | — |
| 8 | " | " | — | — | — |
| 9 | " | " | — | — | — |
| 10 | " | $e^7$—¼ tone | — | ¼ tone | 131½ |
| 11 | " | " " | — | " " | " |
| 12 | " | " " | — | " " | " |
| 13 | " | " " | — | " " | " |
| 14 | " | " " | — | " " | " |
| 15 | " | " " | — | " " | " |
| 16 | " | " " | — | " " | " |
| 17 | " | " " | — | " " | " |
| 18 | " | " " | — | " " | " |
| 19 | " | " " | — | " " | " |
| 20 | " | " " | — | " " | " |
| 21 | " | " " | — | " " | " |
| 22 | " | " " | — | " " | " |
| 23 | " | " " | — | " " | " |
| 24 | " | " " | — | " " | " |
| 25 | " | " " | — | " " | " |
| 26 | " | " " | — | " " | " |
| 27 | " | d#⁷ | — | " " | 131 |
| 28 | " | " | — | ½ " | " |
| 29 | " | " | — | " " | " |
| 30 | $e^{-8}$+¼ tone | " | ¼ tone | " " | 130½ |
| 31 | " " | " | " " | " " | " |
| 32 | " " | " | " " | " " | " |
| 33 | " " | " | " " | " " | " |
| 34 | " " | " | " " | " " | " |

| Age. | Lower Limit. | Upper Limit. | Normal Loss Below. | Normal Loss Above. | Normal Auditory Field in Square *cm.* |
|---|---|---|---|---|---|
| 35 | e—$^{3}$ + ¼ tone | d#$^{7}$ | ¼ tone | ½ tone | 130½ |
| 36 | " " | " | " " | " " | " |
| 37 | " " | " | " " | " " | " |
| 38 | " " | d#$^{7}$ — ¼ tone | " " | ¾ " | 130 |
| 39 | " " | " " | " " | " " | " |
| 40 | f—$^{3}$ | d$^{7}$ | ½ " | 1 " | 129 |
| 41 | " | " | " " | " " | " |
| 42 | " | d$^{7}$ — ¼ tone | " " | 1¼ tones | 128½ |
| 43 | " | " " | " " | " " | " |
| 44 | " | c#$^{7}$ | " " | 1½ " | 128 |
| 45 | " | " | " " | " " | " |
| 46 | F$^{3}$ + ¼ tone | c#$^{7}$ — ¼ tone | ¾ " | 1¾ " | 127 |
| 47 | " " | " " | " " | " " | " |
| 48 | " " | " " | " " | " " | " |
| 49 | " " | c$^{7}$ | " " | 2 " | 126½ |
| 50 | " " | " | " " | " " | " |
| 51 | F#—$^{3}$ | " | 1 " | " " | 126 |
| 52 | " | " | " " | " " | " |
| 53 | " | c$^{7}$ — ¼ tone | " " | 2¼ " | 125½ |
| 54 | " | " " | " " | " " | " |
| 55 | F#—$^{3}$ + ¼ tone | b$^{6}$ | 1¼ tones | 2½ " | 124½ |
| 56 | " " | a#$^{6}$ | " " | 3 " | 123½ |
| 57 | " " | a#$^{6}$ — ¼ tone | " " | 3¼ " | 123 |
| 58 | " " | " " | " " | " " | " |
| 59 | G—$^{3}$ | a$^{6}$ | 1½ " | 3½ " | 122 |
| 60 | " | " | " " | " " | " |
| 61 | " | a$^{6}$ — ¼ tone | " " | 3¾ " | 121½ |
| 62 | G—$^{3}$ + ¼ tone | " " | 1¾ " | " " | 121 |
| 63 | " " | " " | " " | " " | " |
| 64 | " " | g#$^{6}$ | " " | 4 " | 120½ |
| 65 | G#—$^{3}$ | " | 2 " | " " | 120 |
| 66 | " | " | " " | " " | " |
| 67 | G#—$^{3}$ + ¼ tone | " | 2¼ " | " " | 119½ |
| 68 | " " | " | " " | " " | " |
| 69 | A—$^{3}$ | " | 2½ " | " " | 119 |
| 70 | " | " | " " | " " | " |
| 71 | A—$^{3}$ + ¼ tone | " | 2¾ " | " " | 118½ |
| 72 | " " | " | " " | " " | " |
| 73 | A#—$^{3}$ | " | 3 " | " " | 118 |
| 74 | " | " | " " | " " | " |
| 75 | A#—$^{3}$ + ¼ tone | " | 3¼ " | " " | 117½ |
| 76 | " " | " | " " | " " | " |
| 77 | B—$^{3}$ | " | 3½ " | " " | 117 |
| 78 | " | " | " " | " " | " |
| 79 | B—$^{3}$ + ¼ tone | " | 3¾ " | " " | 116½ |
| 80 | C—$^{3}$ | " | 4 " | " " | 116 |

To calculate the acuteness of hearing for tones by aid of the table two methods are available.

1. To estimate the area enclosed between the curve and

the axis of abscissas. This may be accomplished by counting the small millimetre squares, a somewhat tedious procedure, or by the aid of a planimeter, or finally by weighing the piece of paper cut out along the curve and the axis of abscissas.

2. We may divide the area thus estimated by the area of the normal auditory field for a corresponding age.

If desired the latter of these procedures may be omitted and the form of a common fraction be retained. In this the value of the pathological auditory field forms the numerator, that of the normal field the denominator. An example may be cited. A woman sixty-six years of age suffering from sclerosis. Acuteness of hearing for whispered speech 30 *cm*, that is $\frac{1}{60}$ ($\frac{.30 \text{ metre}}{18 \text{ metre}} = \frac{1}{60}$). For the same ear we constructed the accompanying auditory field. To save space the upper part of the field has been omitted. Its area is 5.45 *cm*. At the same age the normal field would contain 120 *cm*. We estimate the general hearing for tone therefore at $\frac{5.45\ cm}{120\ cm} = \frac{1}{22}$. It is apparent that there exists a marked difference between hearing for speech and that for tones. The latter is three times greater. The question is, Can this remarkable difference be due to errors in the method? The amount of difference found here makes it improbable that the slight uncertainties of our technique should be made accountable for it. In whatever way we attempt to make the correction, the difference always increases, never diminishes, and it is clear that in this case of sclerosis, and it is so in many, tone-hearing exceeds hearing for speech widely.

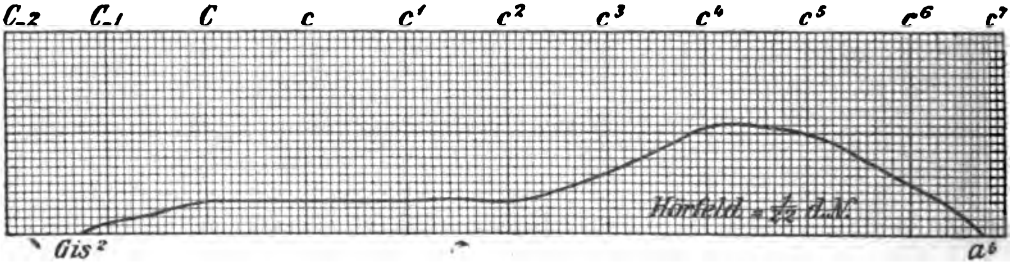


FIG. 1.

The cause of this symptom might be discussed here, but I shall reserve it for a later article.

In the future we shall be forced to designate the quantitative relation of the two with increasing accuracy and precision. We shall earliest acquire exactness for the hearing of tones, and I believe our science has this task to finish among the first. In addition a measurement of hearing will be reached which will suffice for all theoretic requirements and teach us a determination of acuteness of hearing which I may call absolute.

## SUMMARY.

1. If Gradenigo's auditory field is completed and constructed according to physical laws, it furnishes an absolute measure for the acuteness of hearing. It is only necessary to compare its area with the normal area at a like age in order to obtain a quantitative expression of the sensory acuteness in general.

2. For the construction of the auditory field five observations will provisionally suffice: Lower boundary tone, $C$, $c^3$, $f^{\#4}$, and upper boundary tone. Only in case tone gaps are present will it be necessary to undertake measurements of a greater number of steps. By a previous orientation we shall have found the most appropriate points on the scale for each individual case.

3. For certain scientific examinations a more exact estimate of the auditory field will be required. In this case the number of steps measured must be as great as possible. If it were practicable to establish a quantitative estimate for each tone of the chromatic scale, the size of the auditory field would give the absolute acuteness of hearing. Our clinical estimates should approach this limit as closely as possible.

# HISTORY OF A BRAIN TUMOR.

By Prof. S. MOOS, of Heidelberg.

Translated by Dr. A. B. Kibbe, Seattle, Washington.

(*With Plates I. and II. of Vol. XXV. of German Edition.*)

March 21, 1888, I was consulted by a patient twenty-one years of age, by occupation a merchant.

His present trouble appeared during the first week in January, 1888, at which time he had been working in a cold store. Early in February his gait became unsteady, and for the past five weeks he has been very hard of hearing. He has also been under the treatment of Dr. Weiss for diplopia on the left side.

*Status Præsens.* There exists paralysis of the left facial. He can still whistle, but can neither wrinkle the left brow nor blow his nose. The naso-labial fold has disappeared. No epiphora. Total deafness for speech in the left ear. Tuning-fork test by bone-conduction, positive in the right, negative in the left. Forks of 128 and 256 vibrations, but not higher, are still heard by air-conduction at a distance of a few centimetres. A loud ticking watch is heard when pressed against the left ear; also by bone-conduction. The acumeter is similarly heard. No tinnitus. Examination of the left middle ear gave normal findings. Right ear intact throughout.

Regarding the examination of the eyes, the following report was received from Dr. Weiss:

"Not quite normal acuteness of vision in both, with myopia $\frac{1}{7}$. Diplopia resulting from paralysis of the left

Fig. 1.

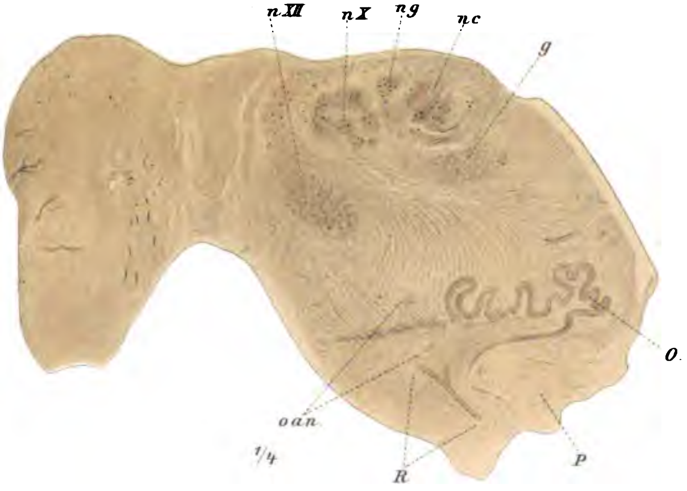
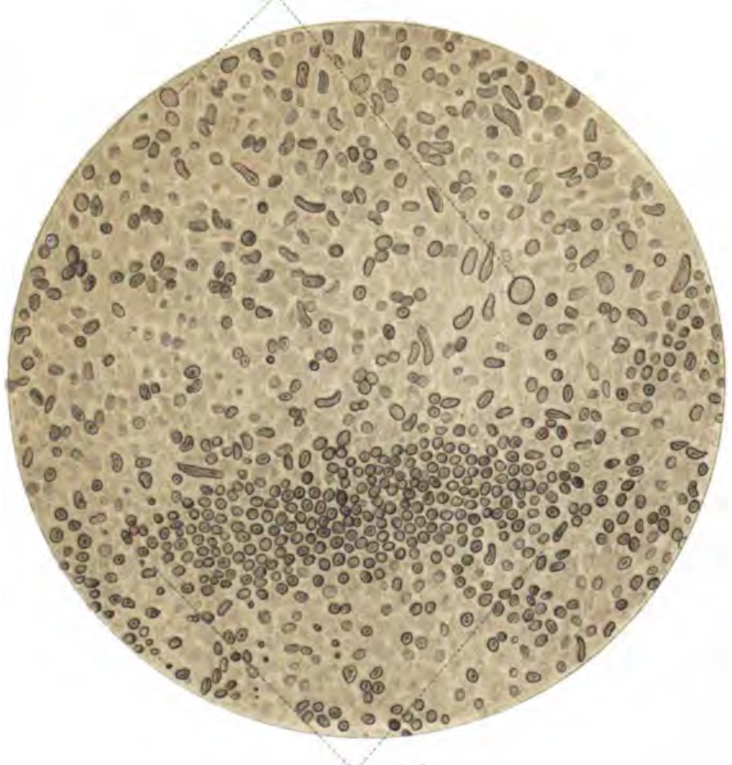
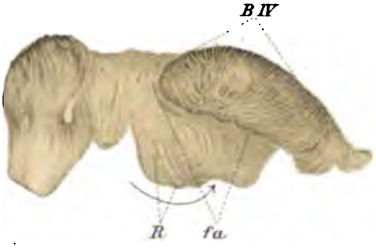


Fig. 3.



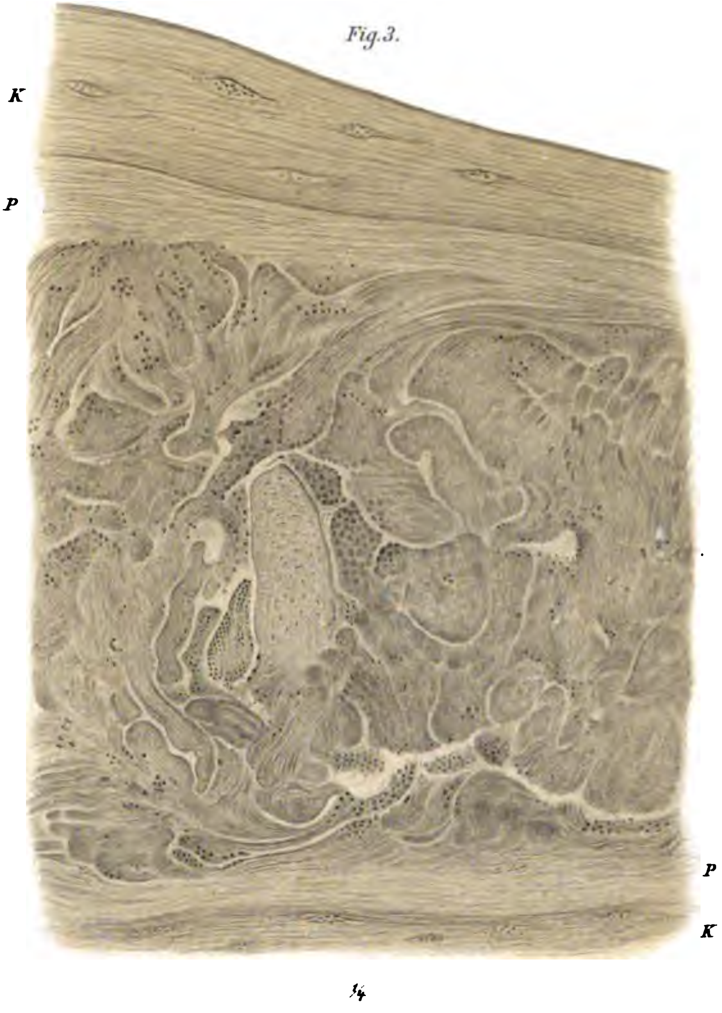
F. Vath gez. Verlag v. J. F. Bergmann, Wiesbaden. Lith. Anst. v. C. Kirst, Leipzig

*Fig. 2.*



*2/1 (Loupe)*

*Fig. 3.*



34

F. Vath gez. Verlag v. J.F. Bergmann Wiesbaden Lith. Anst. v. C. Kirst, Leipzig.

abducens. Ophthalmoscopic examination reveals no gross changes." The report of April 6th reads: "With high myopia a slightly reduced acuteness of vision. Ophthalmoscopic findings not normal; slight veiling; otherwise as before."[1]

From these symptoms the probability that their cause was to be looked for in a brain tumor became justified, and I therefore stated to the father, soon after my first examination, that his son was not affected with an ordinary form of deafness, but rather with a severe brain affection, and advised, therefore, a consultation with Prof. Erb, which took place March 21st, and gave the following results:

Paresis of left abducens. Pronounced nystagmus in all directions. Paresis of left facial. Uvula not exactly straight. Slight dulling of sensibility of the left half of face. Hearing as above. Tongue straight. Frequent difficulty in swallowing of late.

Sleep, memory, and speech good.

Staggering gait. Cerebellar ataxia, particularly in the left leg.

Dynamometer: Right, 65°; left, 51°.

Sensibility of left extremities good. Left hand and fingers slightly stiff. No contractures. Tendon reflexes in the left arm increased. Standing with closed eyes good. Standing on toes possible. Pupils normal. Visual acuity, etc., as above. In consideration of the cerebellar ataxia, the paresis of the left facial and abducens, the participation of the left trigeminus and the acoustic, and the slight weakness and increase of tendon reflexes on the left side, the diagnosis was made of an affection of the cerebellum and medulla, probably a tumor (glioma).

Course of disease to the date of death:

*April 13th:* Total extinction of hearing power for all sources of sound.

Increase in facial paralysis. Angle of mouth strongly drawn to the right. Incomplete closing of left eye during sleep. Some ability to whistle still present.

---

[1] I requested an ophthalmoscopic examination later, but was refused it by the father. Whether choked disc was present later is on this account uncertain.

Diameter of pupils variable, the left being occasionally the larger.

Speech good.

No fever at any time. Within two days of death pulse between 60 and 70, strong; after this 56.

Vomited one or more times each day.

Staggering gait as before. No ptosis, no alternating paralysis.

Consciousness retained up to the last day.

Death shortly before midnight April 26th.

*Autopsy.*—On removal of the skull-cap, to which it was loosely attached, the dura mater appeared moderately tense on both sides and in contact with the convexity throughout. Fluid blood in the posterior portion of the longitudinal sinus. No thrombi. Veins of the dura filled with blood. In the subdural space, a slight increase in amount of clear serum. Pial veins tense. The pia itself on the convexity was clear and transparent; at the base, however, particularly over the fossa Tarini and the left fissure of Sylvius, it was milky-white and thickened.

The gyri of the cerebral convexity slightly broad and flat, otherwise the cerebrum viewed externally as well as from an incision made forwards from about 1 *cm* in front of the optic chiasm was without noticeable change; its substance moderately vascular and greatly infiltrated with serum. Lateral ventricle not essentially dilated. The upper surface of the cerebellum appeared equally unchanged; on the under surface, however, a tumor is present, of a grayish-white color, without externally visible hemorrhages, soft, and markedly œdematous.

It includes the location of the left crus of the pons, the outer part of the left half of the pons, and the adjoining section of the crura of the cerebrum, which structures with a moderate increase in area, have been completely transformed into tumor mass. A strip about 1 *cm* broad lying alongside the median line of the left half of the pons, has apparently remained intact. From here the tumor extends towards the cerebellum and the medulla oblongata, and penetrates to the interior of the left hemisphere of the cerebellum without, however, altering its form or boundary; in the cord the left pyramid, slightly more atrophic perhaps than on the other side, with the roots of the hypoglossal, is intact. The lateral portions are replaced by the tumor in such a manner that the medulla oblongata at about the level of the centre of the olivary body is 2½ *cm* broad.[1]

Correspondingly the left half of the fourth ventricle is marked only by a narrow and shallow depression. Inferiorly the tumor appears to extend about 1½ *cm* from the lower angle of the rhomboid fossa.[2]

The sinuses of the base of the skull contain but little fluid blood. The brain was not dissected further but was hardened in toto.

Summary of cranial nerves at base of brain on its removal:

| *Right.* | *Left.* |
|---|---|
| Olfactory, optic, oculo-motor, and trochlear are wanting. The other eight are present. | Olfactory, optic, oculo-motor, trochlear, trigeminus, and abducens are wanting; auditory and facial have disappeared in the tumor mass. The other nerves are present. |

## HISTOLOGICAL CHARACTER OF THE TUMOR.

The homogeneous, finely fibrillated groundwork is permeated partly with scanty, partly with moderately filled delicate-walled blood-vessels, only a few showing a thickening of their walls. The bulk of the tumor consists of small round and spindle cells; the former lying in heaps around the vessels. Branches of the latter are often in close association with the vessel walls, whereby a thickening of the latter is evident (see above). In a few completely non-vascular localities smaller and larger collections of exuberant glia cells are seen. Normal nerve fibres are sometimes discovered singly, at others in fairly wide bundles. The latter appear particularly plain in nigrosin[1] preparations and those treated by Pal's method.[2]

---

[1] In contrast with 1½ *cm* on the right side.

[2] It so appeared macroscopically. The microscopic examination, however, gave a different result (see farther on).

Dark-contoured ganglion cells with faintly colored nucleus without a trace of processes are seen singly which at first sight simulate large sarcoma cells. Nucleus and protoplasm of the ganglion cells are frequently markedly granular, with commencing fatty degeneration. The tumor is therefore a primary, mainly small-celled, round, and spindle-celled sarcoma, having in places the character of a glio-sarcoma.[3]

Regarding its origin two things are possible. Either development took place from the glia cells, or the tumor arose from the blood-vessels, or both. The first hypothesis is supported by the finding of glia cells although these were few. The second by the heaping up and grouping of the previously mentioned cell elements in the immediate neighborhood of the blood-vessels (Fig. 3).

From what spot the tumor sprang is difficult to say; in all probability from the external portion of the left half of the pons; for toward the centre it was free for the distance of 1 *cm* (see above).

The development of the tumor from the pons is probable from the early appearance of staggering gait, even though it has been established that this symptom is only an exceptional consequence of tumors in this locality (see later). The great expansion of the tumor by including the left crus of the pons and of the cerebrum, its extension toward the cerebrum and in the direction of the medulla oblongata, caused a pressure on the neighboring parts and through this their displacement.

A view of Figs. 1 and 2 shows the raphe on the *right* side. The left side showed with the naked eye a narrowing of about one half (microscopic examination revealed simple atrophy from pressure). Between the inner right and left parts a deep furrow exists which contained tumor masses which in the autopsy were described macroscopically as prolongations of the tumor. In fact, the tumor masses found here stood in no organic relation with the medulla oblongata. They had exerted, however, a pressure indicated by the arrow (Fig. 2) in the direction of a concave curve from the left below to the right above. In consequence of which, in addition to the crowding of the raphe to the right as already described, there was a complete displacement of the fibres in the same direction, exemplified by a bending of the fibræ arciformes externæ from their course toward the pyramid in such a manner that they ran almost horizontally outwards to the right.

---

[1] See Friedlaender's *Mikrosk. Technik*, 4te Auflage, Berlin, 1889, S. 98.

[2] *Ditto.* Weigert's *Hæmatoxylin method modified by Pal*, S. 97.

[3] Birch-Hirschfeld, *Pathologische Anatomie*, II. Auflage, Leipzig, 1887, gives the following statistics regarding 30 cases of tumor of the pons: 17 tubercular, 3 syphilomata, 5 gliomata, and 5 sarcomata. The glio-sarcoma is distinguished from the glioma by the greater richness in cells and the not uncommon manifestation of a tendency to the formation of metastases. It develops from the cells of the neuroglia in the same way as does pure glioma.

The right restiform body was destroyed by pressure (see Fig. 1. the lateral part between *g* and *o*).

In sections of the upper half on the right side, nerve fibres in nearly normal abundance were present, while those of the under half seemed to be scanty. In addition to the olive, two nuclei with well preserved ganglia are seen on the floor of the fossa rhomboidalis (see explanation of cuts) of the right side. At the left nothing of this kind is apparent, a degeneration of the ganglion cells as well as of the nerve fibres having taken place.

Particularly noteworthy is the *entire disappearance of the nuclei and root fibres of the abducens, facial, and auditory of the left side.*

## RESULTS OF THE EXAMINATION OF THE LEFT TEMPORAL BONE.

### THE MIDDLE EAR.

The articulations of the ossicles as well as the mucous membrane of the labyrinth wall are normal.

The centre of the tensor tympani muscle consists of fat; the remainder has undergone waxy degeneration. Nowhere is even a single normal muscle fibre to be found. Between the periosteum of the stapedius and its septa are numerous blood extravasations: structure of the muscle normal in the main; a few fibres waxy or changed to connective tissue. Vestibular connection of stapes normal.

## THE LABYRINTH.

The pyramid of the petrous bone is marked by numerous non-ossified areas of cartilage (chondroblasts); in addition by several spots of cicatrized necrosis, such as I have described and figured in these ARCHIVES, vol. xxii., p. 64.[1] The bone corpuscles in the pyramid are also frequently altered; sometimes having a homogeneous glistening fatty appearance, at others being regular in form but with stunted or entire absence of processes, without nucleus, or granular (see Fig. 4).

In many places the medulla of the pyramid has undergone a colloid change.

## THE AQUÆDUCTUS COCHLEÆ.

In its interior a small extravasation of blood. Evidences of stasis in the veins: densely packed with deformed blood corpuscles.

## AQUÆDUCTUS VESTIBULI.

At the inner fourth the bony canal becomes suddenly irregularly dilated with hyperplastic periosteum, on the borders of which toward the interior are two round particles of bone encapsuled by thick bands of connective tissue,—probably a cicatrized necrosis of the bony wall with encapsulated sequestra. The inner part (vestibular half) of the canal contained great numbers of connective-tissue cords extending from the periosteum and crossing its interior from one side to the other.[2]

They have no epithelium as do those springing from the papillæ and, aside from their marked thickness, might on this account be considered pathological. Between the meshes of the connective-tissue bands tensely filled blood-vessels are seen with here and there smaller and larger blood extravasations. Nucleus and protoplasm of the epithelium of the papillæ often show commencing fatty degeneration; the granular contents of the nucleus and part of the protoplasm staining black with osmium.

---

[1] Many still showed healing to have taken place by aid of osteoblasts.

### CONDITION OF THE FACIAL AND AUDITORY NERVES.

The facial, shortly before its separation from the auditory, shows a destruction of its superficial layers by hemorrhage, which extends slightly beyond the point where it crosses the ligamentum spirale. The central portions which still remain intact in this section show imperfect osmium staining, having a greenish or smoky topaz-like appearance, and only becoming black 3 *mm* before the last bend. Fresh hemorrhages exist in a few places.

The hemorrhagic destruction of the auditory is more marked than that of the facial. Here and there in its course large fresh hemorrhages are seen in place of the destroyed nerve. The nerve cells of the individual turns of the ganglion spirale were still intact, while the greater part of the same as well as those of the trunk of the acoustic and the ganglion geniculi were altered. In many places the nuclei of Schwann's substance had disappeared while the wall of the ganglion cell was still retained.

### THE CELL FORMATIONS.

This in individual regions of the entire cochlea, particularly of the ductus cochlearis, showed a commencing fatty degeneration similar to the ganglion cells; likewise the cells of the sulcus spiralis internus and externus, of Corti's arches, of the ligamentum spirale, and those of Reissner's membrane.[1]

### REISSNER'S MEMBRANE.

Was depressed toward the ductus cochlearis.

### THE MEMBRANE OF THE ROUND WINDOW

*was convex outwardly*, and unchanged in structure; especially noteworthy is it that there were no pseudo-ligaments on its exterior, which as we know are often present and cause a convexity of the membrane outward.

---

[1] The commencing fatty degeneration of the ganglion cells and of the cell elements in the labyrinth are to be looked upon as a consequence of circulatory disturbance.

## THE AMPULLÆ.

The following is worthy of note. The nerve and lining epithelium were changed in a similar manner to the cellular elements of the ductus cochlearis; likewise the cells of the sacculus endolymphaticus around the cupula terminalis. The blood-vessels of the cristæ were densely filled and almost perfect in appearance as though naturally injected.

## UTRICLE AND SACCULE.

Their cellular elements were similar to those of the cristæ. The blood-vessels between the ligaments tense. Interior of both saccules normal.

## THE SEMICIRCULAR CANALS.

On the outer wall of the posterior semicircular canal, the vessels of which show globular stasis, were one small and one large blood extravasation; with this exception it was normal. The endolymphatic space of the median crus of the exterior canal was filled for a short distance with connective and osteoid tissue. The perilymphatic space was normal.

The most important changes were shown by the

## ANTERIOR SEMICIRCULAR CANAL,

one portion of which showed the endolymphatic space filled with connective and osteoid tissue, and the perilymphatic with thick bands of connective tissue and large thick-walled tense blood-vessels, between which were numerous small blood extravasations. In the other portion the ends and perilymphatic spaces formed a common cavity filled with hyperplastic periosteum, osseous and connective tissue, amorphous masses, and numerous fatty granules lying singly and in groups, between which were rifts and fissures, caused by destruction of tissue, without a trace of blood-vessels (see Fig. 4).

## ANALYSIS OF THE SYMPTOMS PRESENT.

According to the patient's statements, staggering gait was the first symptom manifested, later left-sided deafness. It is possible that the latter was the first to arise and was only noticed when it reached the high degree already described. At all events the staggering gait was a very early symptom. This point seems to me to be very important in reference to the origin of the tumor.

In his *Topischen Diagnostik der Gehirnkrankheiten* Nothnagel says in the chapter on diseases of the pons: "Ataxia does occur in tumors of the pons, more often really through pressure, though in a few cases this symptom was present in pure pons affections."

M. Bernhardt says:[1] "In 19 cases there was staggering gait twice (the tumor included the entire pons and exerted pressure outwardly), once inability to walk." In our case, as the autopsy showed, without doubt a strong pressure on the cerebellum existed, though late in the disease. At this time in the disease the staggering gait may be assumed to be an indirect focal symptom, but whether also for the first period of the tumor's development remains very doubtful.

Diplopia also appeared on the left side very early. This annoyed the patient more than the disturbance in hearing. On this account he sought assistance earlier. The affection was homonymous and is not uncommon in diseases of the pons (Nothnagel *l. c.*). Bernhardt (*l. c.*) found homonymous diplopia 20 times in 29 cases of pons tumor. This symptom is sufficiently explained in our case by the complete destruction of the abducens and root fibres.

The paresis of the entire facial appeared very early and on the same side with the previously mentioned disturbance. It is explained by the destruction of both nuclei of the facial and its root fibres. As is well known it is very characteristic of pons tumors when combined with paralysis of contralateral extremities, which was absent in this case.

Implication of the entire facial, noted as a peculiarity by Nothnagel, was present, which he states always appears when, as in our case, the common nucleus of the facial and abducens is attacked. The increase in the facial paralysis from the 14th of April on, may be referred to the hemorrhage in the course of the nerve through the petrous bone. Nystagmus according to the same author is rare in pons tumors. In our patient it was present in a pronounced degree, likewise anæsthesia of the trigeminus (to a slight extent). Nothnagel also states that the trigeminus is relatively often affected in pons tumors. The autopsy afforded no manifest explanation of these symptoms.

---

[1] *Beiträge zur Symptomatologie der Gehirngeschwülste*, Berlin, 1881.

## THE DISTURBANCES OF HEARING.

According to Nothnagel these are among the greatest rarities in pons tumors. This is certainly noticeable when we consider the anatomical relations. Bernhardt says: "Disturbances of hearing are relatively as rare as those of vision. Both occurred 8 times in 27 cases. Usually the hearing on the same side as the tumor was impaired by tinnitus, seldom entirely lost. In this connection the fact must not be lost sight of, that, in a few cases, alongside of the tumor in the pons itself pathological changes were discovered near the base. In one instance the auditory has been described as having been destroyed by the pressure of basal changes."

In connection with our observations the case of Wernicke[1] is particularly noteworthy. The patient manifested on the side corresponding to the tumor "probably slightly weaker hearing," and yet the autopsy showed "a large portion of the inner and outer auditory nucleus" destroyed (nomenclature according to Meynert). Unfortunately the report of the autopsy contained no reference to their root fibres.

Regarding the functional disturbances of hearing the following factors are to be considered with reference to the changes found in the central organs and petrous bone.

1. The fact that the ventral as well as the dorsal nucleus of the acoustic and its root fibres had completely disappeared in the tumor mass, as shown by careful examination.

2. The hemorrhage in the main trunk of the acoustic in

---

[1] *Archiv f. Psych. u. Nvkh.*, Bd. vii., S. 513.

the porus opticus internus and the consequent obstruction of its fibres progressively increasing peripherally as far as the separation of the fibres to the ganglion spirale in the individual turns,—changes which alone are sufficient to explain the almost if not quite complete deafness. The cochlear hemorrhage probably occurred in the later period of increased intracranial pressure, this being a passive occurrence, and is explained by the experiments of H. Grasley,[1] which show that, by increasing intracranial pressure, the most peripherally placed of the veins have their openings into the sinuses compressed, and in consequence the pressure in the intravascular system is raised. This increase was still further added to by the described changes in the aquæductus vestibuli, and in the medial and frontal semicircular canal, which, without doubt, must have had as a consequence a hindered flow of lymph from the labyrinth.

3. Lastly, I may not omit the above described change in the position of Reissner's membrane and the membrane of the round window.

At the Second International Otological Congress at Basel in 1884, I treated this subject exhaustively in my paper "On the Genesis of Auditory Disturbances in Brain Tumors; The Diagnostic Value of Tuning-Fork Experiments," from which I arrived at the following conclusions:

The extension of increased cranial pressure, arising from a brain tumor, to the labyrinth is anatomically and physiologically possible. The equalization of pressure is probably and anatomically proved by the flow of cerebro-spinal fluid toward the vertebral canal, and that of the lymph through the foramen cæcum, and the jugular and occipital foramina (Merkel).

The consequences of increased pressure are, however, much less frequent than in the optic, as choked disc from brain tumors occurs much more often than disturbances of hearing.

According to the findings of experimental physiology,[2] which show that in raised intracranial pressure the round window suspends its function earlier in the conduction of high tones than in that of low ones, the perception of high musical tones is soonest destroyed in cases of brain tumor with raised labyrinthine pressure.

---

[1] "Experimentelle Beiträge zur Lehre von der Blutcirculation in der Schädelrückgratshöhle." *Festschrift*, München, 1892.

[2] Ch. Burnett: "Untersuchungen über den Mechanismus der Gehörknöchelchen und des runden Fensters." *Arch. f. Aug. u. Ohrenheilk.*, ii., 1872.

In the position of Reissner's membrane and the membrane of the round window in our case, we believe we have furnished proof of increased pressure in the perilymphatic space. In addition, it is worthy of note that the hearing power *for tones from the upper to the lower tone limits was lost.* Unfortunately the case was so complicated that the presumption of absent perception of the high tones consequent on increase in labyrinthine pressure could not be converted into a certainty. If we desire to assume, which certainly is justifiable, that the cochlear hemorrhage may be viewed as the latest change, there still remains as an essential factor the disappearance of the nuclei of the acoustic and their root fibres, which must also be taken into consideration.

Regarding the tests of function there still remains as noteworthy, *the relatively long retention of bone-conduction*, which Politzer first pointed out as characteristic of brain tumors.[1]

## REMARKS ON THE CHANGES IN THE PETROUS BONE NOT CONNECTED WITH DISTURBANCES CAUSED BY THE BRAIN TUMOR.

The patient stated that between his sixth and eighth year he had measles and scarlatina. With one of these infectious diseases, or possibly with both, may be connected:

1. The waxy degeneration of the tensor tympani. As the patient played the piano and had never been aware of any disturbance in hearing previous to his present illness, it is probable that the function of the right ear was entirely normal.

2. The previously described disease findings in the bony tissue of the pyramid of the petrous bone, as well as the peculiar changes of the bone corpuscles, the colloid change of the medulla, and necrosed spots (which had healed) in the

---

[1] *Lehrbuch der Ohrenheilkunde*, II. Auflage, 1887, S. 415.

pyramid and in the aquæductus vestibuli may have been caused by the immigration of bacteria into the bone corpuscles or medullary spaces by way of the aquæductus vestibuli from the blood-vessels of the periosteum.

3. The findings in the frontal (in part those also in the median) semicircular canal I take to be the result of the mechanical influence of those micro-organisms which wandered there at the time the infectious diseases existed, therefore as products from lymph-cell conglomerations.

*Explanation of Figures.*

FIG. 1. Cross-section through the medulla oblongata a little below the middle of the olivary body, posterior to the tumor. Carmine ; $\frac{1}{4}$ natural size.

| | | |
|---|---|---|
| n. xii. | Nucleus of the hypoglossus | Normal. |
| n. x | " " vagus | |
| n. g. | " " Funiculus gracilis | |
| n. c. | " " " cuneatus | |
| g | Substantia gelatinosa | |
| O | Olive | |
| O a n | Internal accessory olive | |

R Raphe. Within it a large blood-vessel.

P Pyramid. The lowest border of which (lateral part in the drawing) has been omitted.

FIG. 2. Section as in Fig. 1. Pal's method of staining ; $\frac{4}{1}$ the natural size.

| | |
|---|---|
| B iv | Floor of the 4th ventricle. |
| f a | Fibræ arciformes externæ. |
| R | Raphe. In both drawings it appears on the right side. |

→ Course of pressure exerted by tumor, in the area of which the vicinity of the pyramid was destroyed by the preparations for removal of brain.

See foot-note to report of autopsy.

N. B.—In figures 1 and 2 only the right side have been marked with letters.

FIG. 3. A section of tumor in the vicinity of the left crus of the pons close to the latter. Eosin-hæmatoxylin stain. Numerous round and spindle-shaped cells are seen, the latter slightly less in number. The former particularly numerous in the vicinity of the blood-vessels. Basement substance and specific elements

alike faintly stained. No evidence of nerve fibres or their elements. Here and there are seen a few dark canton-red degenerated ganglion cells (*g z*) with faintly stained nucleus without process.[1]

FIG. 4. Sagittal section through the posterior semicircular canal. Hæmatoxylin. Acid fuchsin, picrocarmin. *K* bone, *P* periosteum, the latter greatly thickened, the former poor in bone corpuscles, which have stunted processes, and are markedly granular. Endo- and peri-lymphatic spaces form a common space, which is filled with bridges of connective tissue more or less thick, ostoid tissue, the latter particularly plain in the centre, amorphous masses, numerous fat granules stained black with osmic acid, and lying singly or in heaps. In the field are many rifts and fissures caused by destruction of connective tissue. No blood-vessels to be seen.

---

[1] The lower figure on plate II, erroneously designated as Fig. 3.

# REPORT ON THE PROGRESS OF OTOLOGY DURING THE SECOND HALF OF THE YEAR 1893.

## I.—NORMAL AND PATHOLOGICAL ANATOMY, HISTOLOGY, AND PHYSIOLOGY OF THE HEARING ORGAN AND THE NASO-PHARYNGEAL CAVITY.

By Prof. AD. BARTH, Marburg.

Translated by Dr. Max Toeplitz, New York.

### A.—ANATOMY.

#### *a.*—HEARING ORGAN.

1. **Randall.** Preliminary communications on measurements of the skull with reference to the anatomy of the ear. *Trans. Amer. Otol. Society*, vol. v., part 2, 1892.

2. **Bertelli.** The structure of the membrana tympani (presented by Romiti). *Trans. of Anat. Soc. at Goettingen*, 1893. From the *Anat. Anzeiger*, 1893, p. 204.

3. **Howe, M. L.** The comparative anatomy of the ossicles. *Amer. Otol. Soc.* Review in *Rev. de Laryng.*, etc., 1893, p. 784.

4. **Habermann, J.** Cholesteatoma of the middle ear. Reprint from the *Mittheil. d. Vereins der Aerzte*, in Styria, 1893, Nos. 8 and 9.

5. **Manasse.** Pathologico-anatomical communications from the policlinic of the university at Strassburg. *Virchow's Archiv*, vol. cxxxiii., p. 387.

6. **Steinbruegge.** The ductus cochlearis of man in the vestibular blind sac. *Anat. Hefte*, part i., No. viii., 1893.

7. **Lenhossek, M. von.** The nerve terminations in the hear-

ing organ. *Trans. of the Anat. Soc. at Goettingen*, 1893. *Anatom. Anzeiger*, 1893.

8. HELD. The central conduction of hearing. *Arch. f. Anat. u. Entwicklungsgeschichte; Anat. Abth. des Arch. f. Anat. u. Physiol.*, 1893, Nos. 3. and 4.

9. PENZO, R. The ganglion geniculi and its associated nerves. (From the Anat. Inst. of the university at Padua.) *Anat. Anz.*, 1893, p. 738.

10. MARTIN, PAUL. Contribution to the termination of the acoustic nerve in the brain of cats. *Anat. Anz.*, 1893, p. 181.

11. SALA. The origin of the acoustic nerve. *Arch. f. mikrosc. Anat.*, 1893, vol. xlii.

12. HELD, D. H. Contributions to the finer anatomy of the cerebellum and the cerebral trunk. *Arch. f. Anat.*, Phys.-Anat. part, 1893 Nos. 5 and 6.

1. The examinations of 122 skulls are not in accordance with Koerner's views of a definite relation between the form of the skull and the location of the lateral sinus and the middle cerebral fossa. They confirm only the fact that the right lateral sinus is situated more anteriorly and outward than the left.

2. BERTELLI presents through Romiti the results of examinations of the comparative anatomy of the membrana tympani, which will be more fully published. 1. In the membrana tympani of mammals, apart from the fixed cells of the connective tissue, as described by Troeltsch, other fixed cells are found which are situated upon the outside of the membrana tympani. These cells exhibit many processes anastomosing with one another. 2. Among the gnawers an abundance of cartilaginous cells exist in the annulus tympanicus, in isolated numbers, also in that of man. 3. The foramen Rivini is not a normal formation.

3. Gruber's view of the transformation of the long process of the malleus into connective tissue, which is thus to be considered as a ligament, is confirmed by comparative anatomy. The representation of the malleo-incudal articulation of Helmholtz holds good also in the orang and some higher animals. The form of the malleus and incus changes frequently, even in individuals of closely allied families. The form of the stapes always resembles a stirrup.

4. The lecture does not furnish any new ideas, but a good synopsis on the present state of the knowledge of cholesteatoma

with preference given, of course, to the personal views of the lecturer. The paper is illustrated by personal observations and demonstrations of specimens.

5. In aural polypi from the tympanic cavity of a boy, aged thirteen, there were found lymphomata, cysts, and giant cells. The lymphomata are explained from accumulation of leucocytes, the cysts by their central disintegration, the giant cells by the more intense growth.

6. The vestibular blind sac forms, with all its structure, a well-nigh hemispherical curvature from without toward the inner side. For the better understanding of the relations compare the original, which is illustrated by seven figures.

7. The examinations of the maculæ and cristæ acusticæ of the mouse made with Golgi's method confirm Retzius' views of the exclusive occurrence of free nerve terminations in the sensory epithelia of the hearing organ. The histogenetic and also the trophic centre for the acoustic fibres are situated in the ganglia of the acoustic nerve. The fibres grow from their bipolar nerve cells in two directions, viz.: into the medulla oblongata, and between the epithelium of the nerve terminations, in order to dissolve at either place into free terminating twigs. The nerve penetrates a cell. Strongly stained specimens allow well to distinguish three areas : a layer of hard cells, a stratum plexiforme, and a layer of supporting cells.

8. The central acoustic conduction is formed by the entrance of the cochlear nerve into the brain ; its axis-cylinders, according to the investigations of His, Retzius, and v. Lenhossek, originate in the bipolar cells of the *cochlear* ganglion as their central processes. The cochlear nerve thus acts like a sensory spinal nerve, which enters the gray matter of the spinal cord and dissolves into branches. The first gray masses of the brain, in which the acoustic nerve terminates with its branches, are the *anterior acoustic nucleus* and the *tuberculum acusticum (primary area of termination of the cochlear nerve)*. A number of axis-cylinders of the cochlear nerve form relations beyond this primary zone with other gray masses of the trunk of the brain—*e. g.*, with the upper olivary complex of the same side, probably also with its decussated portion, and perhaps with the lateral nucleus of the lemniscus and the ganglion of the lower corpus quadrigeminum. These *intramedullary direct branches* of the *axis-cylinders* of the *acoustic nerve* form the *foundation* of the *central acoustic conduction ;* they

may be designated as *systems of nuclear fibres.* In the different gray masses of the central acoustic conduction *(anterior acoustic nucleus, tuberculum acusticum, upper olive, and trapezoid nucleus, lateral nucleus of lemniscus, ganglion of the lower corpus quadrigeminum, middle gray matter of the upper corpus quadrigeminum)* ganglionic cells are situated, which are distinguished by a certain size of the cellular body, abundance of protoplasmatic branches, and a long and strong process of the axis-cylinder. They are the *system cells* of the acoustic nerve, because its axis-cylinders anastomose with their protoplasmatic processes. The acoustic impressions are conducted through these system cells, viz., through the branchings of their axis-cylinders. These tracts of axis-cylinders, which advance *in the same sense* as the radical fibres of the *cochlear nerve* in the brain trunk, form together the *systems of the second order.* They form the principal part of the central acoustic conduction. The system cells of those different gray masses of the central acoustic conduction are partly related to one another in such a way as to effect the terminations around higher gray masses of anastomoses of those axis-cylinders which originate farther below from system cells of the central acoustic conduction. The central acoustic conduction is thus partly composed by a number of *neurons.* On the other hand, the different gray masses, in addition, act upon one another, viz., by collaterals of the lower upon the higher system cells. Apart from these ganglionic cells, from which the systems of the second order develop, other ganglionic cells exist at different places of the central acoustic conduction, the axis-cylinders of which form *recurrent systems* of the central acoustic conduction. They arise from higher portions of the central conduction (upper corpus quadrigeminum, middle gray substance) to its deeper gray masses (upper olive, trapezoid nucleus). They take an opposite course to the systems of the second order. Their axis-cylinders thus advance toward the primary zone of termination of the acoustic nerve, so that the final tracts of fibres of the recurrent systems terminate where the first tracts of the systems of the second order originate from. The central acoustic conduction divides into a *transverse portion (trapezoid body),* traversing the brain trunk, and into a *portion ascending* to the middle cerebrum (*lateral lemniscus*). Two lateral lemnisci arise from each side of the trapezoid body ; each containing *for the greater part decussated,* for the *smaller part non-decussated, central paths* of the cochlear nerve, thus establishing *similar* relations for the *acoustic nerve* with those of the *optic nerve*. The *trapezoid body originated* in the *anterior acoustic nucleus;* the axis-cylinders of the system cells, located in this region, become trapezoid fibres. Since the acoustic nerve acts with its fibres and anastomoses of axis-cylinders upon those cells, the *trapezoid body* thus becomes *a central path* for the *cochlear nerve*. With reference to the trapezoid body, we distinguish a *ventral* and a *dorsal* formation; the latter consists of a system, surrounding dorsally the restiform body. This has been designated by former authors as "deep portion of the striæ acusticæ." These *striæ acusticæ proper* originate from the pyramid-like system cells of the *tuberculum acusticum*. Their decussation is situated behind the trapezoid body in the raphé. They join the trapezoid body at the decussated upper olive, in order to form conjointly the lateral lemniscus. *Apart from the anterior acoustic nucleus*, the *trapezoid body originates* also in the complex of both *upper olives* and trapezoid nuclei, so as to intensify here the systems of conduction, developing from the primary zone of termination. The trapezoid body ascends on each side toward the corpora quadrigemina as *lateral lemniscus;* the upper olivary complex also continues upward as "*lateral nucleus lemnisci*." From the cells of this region, which are surrounded by collateral and terminating fibres of the trapezoid body, develop new *lemniscus fibres* which are attached partly to the *systems of the second order*, partly to *recurrent paths*. The central acoustic conduction ends for the greater part as lateral lemniscus in the *ganglion of the lower corpus quadrigeminum* (decussated and at the same side) and in the *middle gray matter of the upper* corpus quadrigeminum with reference to the systems of the radical fibres and the systems of the second order; finally, *the uppermost fibrous tracts* of the *recurrent systems* originate therefrom. For the smaller part the central acoustic conduction runs as *direct acoustic cortical path* (intensified by fibres, originated from the gray matter of the corpora quadrigemina) through the middle cerebrum to the *cerebrum* into the *temporal lobe*. The central acoustic conduction presents a number of fibrous tracts with *reflex character*, connected with gray cerebral masses which partly contain *motory cells for the origin* of different head nerves, partly represent centres which have been physiologically demonstrated in the *formatio reticularis*. The latter are acted upon by *collaterals of the striæ acusticæ* during their course through the entire thickness of the brain trunk, and also those of the *trapezoid body* which dorsally branch off the latter. With reference to the nuclei of the cerebral nerves there exist *reflex arches* to the *facial* and *abducens;* the former form *collaterals* of the *trapezoid body* the latter *a system originating in the olivary complex ("pedicle of the upper olive").* Apart from these reflex paths which are given off in the region of the pons, there exists a powerful and extremely important path for its further relations, the origin of which is situated in the middle cerebrum and descends toward the spinal cord. Its original cells are situated as *large multi polar ganglionic cells in the middle gray substance of the anterior corpus quadrigeminum.* These are not only acted upon by the acoustic nerve, since the final irradiations of the lateral lemniscus ramify around them, but also the *optic nerve* from the roof of the middle cerebrum. It is, therefore, to be designated as the *common reflex path of the optic and acoustic nerves.* It passes for the smaller part, the *decussated nucleus of the oculomotorius;* for the greater part, it descends toward the spinal cord into the masses of the remaining antero-lateral column of the middle line, after having crossed over to the other side at the level of the nucleus of the oculomotorius, immediately below the posterior longitudinal fascicle *(fountain-like decussation of the tegmentum).* It gives off at this region collaterals to the *nucleus of the oculomotorius of the same side and its decussation.* (In man it then descends in the middle portion of the posterior longitudinal fascicle; in lower vertebrates their union takes place in the pons.) Furthermore, collaterals are given off to the *nucleus of the trochlearis* (decussated to the origin of the system) and to the *nucleus of the abducens* (decussated). It results from degenerations that this reflex path reaches the spinal cord, so as to neccessitate optical and acoustic impressions to act also upon the *first cervical,* upon the innervation of which the *turning muscles of the head* are dependent. Hence follows from the anatomical connections and relations of this cerebral *reflex path* that it is well adapted to transfer *impressions of the optical and acoustic spheres* upon the *motory apparatus of the eyes* and the *head.* AUTO-REVIEW.

9. The investigations extend over the anatomy of man, horse, donkey, swine, sheep, dog, cat, rabbit, rat, mouse, and turkey. They refer to the ganglion geniculi, the N. intermedius Wrisbergii, the NN. petrosi superficiales, the chorda tympani, the facial and acoustic nerves. We shall here review the results referring to

the acoustic. Of the two roots of the facial, the thicker anterior is principally motory, the thinner posterior one principally sensory, (PENZO does here not discuss the question, whether the acoustic is not also to be considered as the sensory portion of the facial.) There exist two anastomoses with the facial: a medial one from the intermedius to the acoustic, and a lateral from the ganglion vestibulare to the genu facialis. Whether fibres of these anastomoses remain in the acoustic, or whether the second anastomosis is to be considered only as the termination of all fibres of the former, this cannot be decided. The intermedius sends fibres also to the chorda tympani. Fibres of the sympathetic, viz. from the plexus caroticus internus pass to the ganglion vestibulare of the acoustic. Fibres probably pass also from the glossopharyngeus to the ramus auricularis vagi.

10. MARTIN gives a brief synopsis of the part " Brain," written by him in the third edition of Frank's text-book on the anatomy of domestic animals. The cochlear end region of the acoustic comprises positively the "ventral nucleus" and the " tuberculum acusticum." The vestibular end region is formed by the dorsal "acoustic nucleus," the " vestibular main nucleus," and the Deiters' nucleus. There exist, in addition, a portion of the " ventral nucleus," almost the entire mass of nerve cells, between the floor of the ventricle of the posterior cerebrum, the caudal root of the fifth, and the corpus restiforme, and finally the gray mass in the surrounding of the caudal root of the acoustic. Furthermore, the author describes the various forms of nerve cells and the course of their processes.

11. The investigations were made according to Golgi's method mostly upon bovine embryos and new-born cats. The following conclusions are arrived at: 1. The Deiters', the posterior or dorsal nucleus, and Bechterw's nucleus are not nuclei for the origin of the fibres of the acoustic. 2. The anterior or ventral nucleus is the real nucleus for the origin of the fibres of the posterior root of the acoustic (N. cochlearis), and the tuberculum acusticum is the nucleus for the origin of the greater part of the fibres forming the striæ acusticæ. 3. The anterior nucleus consists in its more central portion of elements with the character of central nerve centres, and in its more peripheric portion of encapsulated elements calling to mind peripheric nerve cells. The nerve process of the former resembles the elements of the second type and forms a network from which the fibres of the inner and

anterior portion of the posterior root of the acoustic develop. The others send forth their nerve process which is implanted at right angles into the fibres of the anterior and posterior roots of the acoustic. 4. The trapezoid body contains fibres originating from the anterior nucleus which have the same importance as one of the branches of the T-shaped division of the nerve process of the more peripheric cells belonging to the anterior nucleus itself. 5. In the posterior root of the acoustic the inner portion (N. cochlearis) develops from the nervous network of the anterior nucleus. The outer portion (striæ acusticæ) originates for the greatest part from nerve cells of the tuberculum laterale, for the smaller part also from more centrally located cells of the anterior nucleus. 6. Between the anterior root of the acoustic and the cerebellum there exists a connection by means of fibres, which arise from the anterior root and pass through a portion of the crus cerebelli, then run along the lateral wall of the fourth ventricle, and finally end in the embolus and in the nucleus of the tegmen. 7. The anterior root of the acoustic contains fibres which originate from the corpus restiforme. 8. The more peripheric portion of the anterior nucleus should be considered as a real peripheric ganglion which, analogous with the spinal ganglia, belongs to the anterior root and to the inner portion of the posterior root of the acoustic nerve.

12. The connection of the cerebellum is threefold, by the connecting crura, the crura ad pontem, and the restiform body. The latter terminates in the vermiform process of the same and the decussated side; collaterals pass to the convolutions of the hemispheres and the nucleus dentatus. Collaterals pass also to the posterior nucleus of the acoustic, the Deiters' nucleus, the vestibular main nucleus, viz., the primary end region of the vestibular nerve. The primary end region of the N. vestibularis is the entire gray floor and the lateral wall of the fourth ventricle, for the N. cochlearis the anterior of the acoustic and the tuberculum acusticum. The inner portion of the restiform body contains the descending partial branches of the N. vestibularis, which end toward the spinal cord with collaterals. The formatio reticularis also, the central gray matter of the cavities, and the decussated half of the brain trunk are primary end regions of the abovementioned nerves. The secondary sensory paths enter: *a*, the remainder of the antero-lateral fascicle of the middle line (of the same and decussated side); *b*, the intermediary olivary layer (de-

cussated); *c*, lateral fields of the formatio reticularis (of the same side). A special secondary path of the vestibular nerve originates from the vestibular main nucleus and enters the remainder of the antero-lateral fascicle. In the central gray substance of the ventricles of the medulla oblongata, there occur, in addition, sensory branches of radical fibres of the vestibular nerve. ASHER.

### *b.*—NOSE AND NASO-PHARYNX.

1. ANTON, W. Contribution to the knowledge of congenital deformities of the nasal septum. *Arch. f. Ohrenheilk.*, vol. xxxv., p. 304.

2. RANGE, M. Macroscopical investigations upon Jacobson's organ. *Cmpts. rend. de la soc. franç. d'otol. et de laryng. Revue de Laryng.*, etc., 1893, p. 597.

3. ROESE, C. The nasal gland and the palatal glands of Crocodilus porosus. (From the Anatom. Inst. at Freiburg <sup></sup>i/Br.) *Anat. Anz.*, 1893, p. 745.

4. MANASSE, P. Pathologico-anatomical communication from the aural clinic of the university at Strassburg. *Virchow's Archiv*, vol. cxxxiii., p. 389.

5. WRIGHT, JONATHAN. Some remarks on the structure of œdematous nasal polypi. *N. Y. Med. Journ.*, Nov. 4, 1893.

6. WINKLER, E. Contribution to the anatomy of the lower wall of the frontal sinus. *Arch. f. Laryng. u. Rhinol.*, vol. i., No. 2.

7. RABE-RÜCKHARD, H. The lobus olfactorius impar of the Selachians. *Anat. Anz.*, 1893, p. 728.

8. SCHMIDT, Prof. Dr. M. The lateral diverticles of the naso-pharyngeal cavity. *Archiv f. Laryng. u. Rhinol.*, vol. i., p. 32.

1. ANTON found, among 65 autopsies of new-born made at Chiari's Institute, nine deformities of the nasal partition wall, viz., in one case a pure deviation, in the remaining eight formation of spurs with deviation of the septum.

2. The lecture, which was illustrated by demonstration of sections and drawings, contains no novel features.

3. The heretofore much discussed question of the occurrence of nasal glands in crocodiles, is answered positively. In addition, palatal glands could be demonstrated.

4. MANASSE found within three weeks, in four individuals,

nasal polypi with formation of bones, which, after their entrance into the polypi, ramified dendritically and appeared as small tubes with a fully developed medullar cavity. In one case there was found also in the fibrous portions of the polypus a considerable accumulation of pigmented cells,—at any rate, blood pigment from former extravasations.

5. WRIGHT describes the change of the cylindrical to the squamous epithelium, which takes place upon surfaces exposed to air and friction. This change, although observed by others in gelatinous polypi, could be observed by him only in growths without œdema, particularly in sarcoma, and is illustrated by three photographs. He demonstrates also thickening of the layers—frequently in form of scalloped fringe in a section through hypertrophy of the middle turbinated body. The *stroma* of polypi consists of a network of areolar tissue with long spindle-shaped cells, the meshes being filled with fibrin. The œdematous fluid contains serum, albumen, and mucin. Exudations of small round cells from the blood-vessels with production of young connective tissue in some sections, give rise to mistakes with sarcoma. Billroth's view of the prevalence of mucous glands in mucous polypi is modified by Wright, who finds fewer glands in them than in the normal tissue. There is no true adenoma in the nose. Blood-vessels are small and scanty in polypi. Cyst formation is occasionally a striking feature, and is due to degeneration of glands or to the breaking down of dilated areolar spaces into one or more cavities, or to dilatation of blood-vessels, which, however, never occurs in gelatinous polypi. Myxoma may occur in the nose, but is not the usual character of gelatinous nasal polypi, which result from chronic inflammation. Polypi are also associated with empyema of the antrum ; but this is either due to ethmoid suppuration or to occlusion of the hiatus semilunaris by polypi, or it is most frequently of dental origin. Polypi do not recur from the stump left, but from the adjacent mucous membrane, which ought to be cauterized. The base of the growths is reached with much difficulty. M. TOEPLITZ.

6. WINKLER examined in 33 cadavers of from twenty to eighty years of age, the frontal sinuses with reference to size, possibility of probing, and perforation from the nose, and of making inferences from outer signs as to the condition of the cavities. There exist no external indications for the diagnosis of the size of the cavities or the thickness of the walls. Of the male cadavers, not

quite one sixth, of the females one fourth of the frontal sinuses could be probed ; on the other hand, about one half of all cases could be trephined from the nose. The zincographs might have been somewhat better.

7. The lobus olfactorius impar described by Kupffer in embryos of acipenser, could also be demonstrated in embryos of *acanthias*.

8. SCHMIDT found, after many futile inquiries, successively in the living three cases of congenital diverticles of the nasopharyngeal cavity, which must have been due to the second branchial fissure. They are not of practical importance.

## B.—PHYSIOLOGY AND PHYSICS.

### *a.*—HEARING ORGAN.

1. SACHS, R. Observations on the physiological condition of the hearing organ of the new-born. (From the policlinic of the university at Goettingen.) *Archiv f. Ohrenheilk.*, vol. xxxv., p. 28, 1893.

2. FUCHS, Prof. FR., Bonn. A case of subjective aural and facial sensations. Auto-observation. *Neurol. Centralbl.*, 1893, p. 777.

3. URBANTSCHITSCH, V. Reciprocal actions between both hearing organs. *Arch. f. Ohrenheilk.*, vol. xxxv., p. 1, 1893.

4. GALTON, FR., and GRUBER, ED., of Jassy. Colored hearing and similar phenomena. *Congrès de psychol. expérim. de Londres*, 1892.

5. BARTH, A. Contribution to the theory of hearing in the inner ear. *Sitzungsber. der Ges. zur Befoerderung der gesammten Naturwissenschaften zu Marburg*, No. 4, 1893.

6. STEIN, Prof. Dr. VON. Apparatus for the determination of the deviations of the static functions of the aural labyrinth and its demonstration. *Congrès Zoöl. Internat. à Moscow*, 1892.

7. KREIDL, A. Contribution to the knowledge of the organ of equilibrium. *Centralbl. f. Physiol.*, 1893, No. 6.

8. MATTE. Contribution to the function of the semicircular canals of the labyrinth. *Inaugur. Dissert.*, Halle, 1892.

9. HENSEN, Prof. Lecture against the sixth sense, delivered before the physiological society at Kiel, on June 12, 1893. *Arch. f. Ohrenheilk.*, vol. xxxv., p. 161.

10. **Melde**, Prof. Some methods for the determination of the numbers of vibrations of high notes. *Sitzungsber. der Ges. z. Befoerd. d. ges. Naturw. in Marburg*, 1893, No. 5.

11. **Melde**, Prof. Resultant tones. *Ibidem*, 1893, No. 16.

1. Children in half sleep are best adapted to these investigations. The twenty children exhibited all a marked reaction to noises, in isolated cases a weak reaction on tones, viz., the high notes ($c^2$ and $c^3$) were better perceived in most cases, in some exclusively. Some children reacted on noises only, not on notes. (Would the reaction on high notes coincide with that of "noises," if the so-called noises had been replaced by tones of the fourth, fifth, and sixth octave?—Reviewer.)

2. Fuchs observed for years, in the transitory state between being awake and asleep, acoustic sensations corresponding to the perceptions during contractions of the tensor tympani. These phenomena of sound, frequently combined with a sensation of light, can be produced at will by movements of the jaw. The contraction of the tensor tympani may take place in a threefold manner: 1. Spontaneously or in attacks, viz., by excitation of the motory centre of the tensor tympani through inner influences of unknown origin. 2. By associated movements, viz., by volitional innervation of the centre for the ascending and descending movement of the lower maxilla and the extension of the excitation to the motory centre for the tensor tympani. 3. As reflex, viz., by transmission of the excitation from the acoustic nerve, irritated by external causes, to the motory path for the tensor tympani.

3. Urbantschitsch distinguishes reciprocal relations between both hearing organs: *A*, Homogeneous reciprocal effects; *B*, Heterogeneous reciprocal effects. The homogeneous effects may be: I., vasomotor; II., trophic; III., sensory; IV., functional. The functional effects depend upon processes of: *a*, sensation; *b*, accommodation. The phenomena of homogeneous mutual relations in both ears are with reference to their reciprocal condition: 1, analogous; 2, alternate; 3, contrary. Heterogeneous effects are produced by influencing the hearing function in one ear through actions upon the sensory nerves of the other ear. These different mutual relations occur either separate, or interchanging, or together; the same etiological agent may thus induce from one ear to the other at a time one phenomenon, at another time another phenomenon. The different chapters are discussed with reference to the literature and illustrated by examples.

4. The authors at least place from the beginning the phenomena of colored audition where they belong, viz., not among the perceptions of sensation, but among the associations, which always exhibit subjective coloring. The ingenious plaything, which presents sensations of different senses as being more or less allied, soon ought to disappear at least from the exact sciences through investigations like these. Apart from the audition, "colored vision, gustation, olfaction, tactility, temperature, resistance, and mobility" are mentioned; besides, of course, gustatory vision, audition, etc.; then, olfactory vision, etc. It does not suffice, however, that two or more perceptions of sense are combined; there appear even more or less colored mathematical figures, rows of figures *a*, *o*.

5. BARTH arrives at the following conclusions: 1. We should suppose that the vibrations of sound transmitted to the ear are propagated in the inner ear as genuine sound waves, not as movement in masses. 2. The relative position of the parts of the inner ear to one another and to the entering sound waves renders it quite probable that a certain rôle may be attributed in the hearing, apart from other functions, also to the vestibule and the semicircular canals. 3. The acoustic excitation is not to be considered as an extremely undisturbed vibration of Corti's organ associated with the endolymph, but also as a disturbance in the intention of associated vibration, viz., as deadening or consuming the movement of sound.

6. VON STEIN has devised an apparatus consisting of two boards, which may be regulated at different angles to each other by ropes running over an axle-tree wheel. The size of the angle may be read from a sector. Von Stein calls it the "static goniometer." In placing one board horizontally and upon the other near the axis of movement, the individual to be examined, normal persons lose the equilibrium in raising the board at an angle of from 35° to 40°. In pathological cases the angle measures 20° and less. The examination upon the inclined plane is combined with closure of eyes and feet, and standing on tiptoe. The aural affections are divided with reference to disturbances of the equilibrium into three classes: 1. Complete loss or decrease of the faculty of hearing with disturbance of equilibrium. 2. Simple disturbances of equilibrium, in which movements in one distinct direction are impossible. Since in these cases the faculty of hearing also was not quite intact, the author assumes that in

cases of disturbances of equilibrium the affection should be located away from the inner ear, if the hearing is normal. 3. The group of mixed cases composed by 1 and 2. These most frequently occur to the physician.

7. KREIDL fully describes the condition of the individual, which in the rotatory experiments deviated from the normal. The man never suffered from vertigo ; even in intensities of current of from 15 to 20 milliamp., conducted through the head. All typical head movements are missing in closing and opening the current. He could on the merry-go-round exactly determine the vertical ; with the eyes closed, however, he could hardly stand on one leg. Kreidl assumes in this case a deficient intra-uterine development of the otolithic apparatus.

8. From experiments made on pigeons in the physiological laboratory at Halle, MATTE arrived at the conclusion that the semicircular canals are of extreme importance for the movement of the head, and secondarily for the movements of the body.

9. HENSEN sharply criticises the latest papers on the function of the semicircular canals, simultaneously protesting against the reproach that he undervalues scientific investigations. He thinks it at least to be quite doubtful whether the inner ear is of any importance for the equilibrium, as it is at present wellnigh generally believed. At any rate, it is thoroughly unjustifiable to speak in this respect of a sixth sense. On the other hand, he emphasizes the fact that the vestibular terminations should be positively considered as important for the hearing.

10. The tone can be transmitted to a glass tube and the number of vibrations easily determined from Kundt's dust-waves according to a given formula. According to this method tones can be determined up to 8000 vibrations.

### *b.*—NOSE AND NASO-PHARYNX.

1. ZWAARDEMAKER, Utrecht. Contribution to the methods of clinical olfactometry. *Neurol. Centralbl.*, 1893, p. 729.

2. FRANKE, G., Berlin. Experimental investigations upon aërial pressure, movement, and change in the nose and its accessory cavities. *Arch. f. Laryng. u. Rhin.*, vol. i., p. 230.

1. An olfactometric method requires : 1, that it elicits, to begin with, the weakest irritations, and passes gradually to the

strongest ones; and, 2, that we may rapidly and continuously rise from the weakest to the strongest olfactory irritations. Both requirements are almost perfectly fulfilled by the author's method with cylinders placed one upon another.

2. The experiments were made upon a model connected with the mouth or nose. The balance of pressure between the outer and nasal air depends upon: 1, the difference of pressure—the larger the difference, the more rapidly the masses of air are moved; 2, the size of the communicating opening—the smaller the opening, the longer the equalization lasts; 3, the amount of air—the smaller the volume, the more rapidly is the equilibrium restored. The difference of pressure between inspiration and expiration is explained: 1, by the inspiration requiring a large muscular exertion, whilst the expiration takes place principally by muscular relaxation, weight of thorax, elasticity of the lungs, and the extended abdominal contents; 2, by being accustomed to extreme expiratory, but weak inspiratory, movements (cough, hawking, etc.—snuffling, snivelling); 3, by warming of the expiratory volume of air, which thus becomes larger than the inspiratory one; 4, by the longer duration of expiration than of inspiration. The amount of aërial pressure in the accessory cavities is determined: 1, by the absolute capacity of the entire nasal cavity; 2, by the relative size—viz., by the difference between the anterior and posterior nares, and the other narrowest passage respectively; 3, by the location of the narrowest transverse section of the nasal cavity; 4, by the amount and force of the respiratory movements. The aërial pressure in normal noses and their accessory cavities amounts to 2–3 *mm* water to the utmost in normal respiration. The author does not believe in an influence of this slight pressure upon the form of the nose. During inspiration the aërial current ascends from the nostril to the nasal roof, whence it descends to the posterior nares. At the nasal floor a vortex is formed in the same direction. The current of expiration takes the same course, but in the opposite direction. The accessory cavities present quite unfavorable relations for the renewal of their air during respiration; they have no function. Their size and development is independent from the different respiratory relations, as well as the width of the nasal cavities from the amount of respiratory pressure.

## II.—PATHOLOGY AND THERAPEUTICS OF THE EAR, NOSE, AND NASO-PHARYNX.

By Dr. ARTHUR HARTMANN, Berlin.

Translated by Dr. Max Toeplitz, New York.

### GENERAL LITERATURE.

1. Lemcke, Prof. Report on the policlinic of the university at Rostock for aural, nasal, and laryngeal diseases from July 1, 1891, to July 1, 1893. *Arch. f. Ohrenheilk.*, vol. xxxvi., p. 55.

2. Gunnert and Panse. Annual report on the work done at the aural clinic of the university at Halle from April 1, 1891, to March 31, 1892. *Arch. f. Ohrenheilk.*, vol. xxxv., p. 231.

3. Bezold, Prof. Preliminary communication on the examination of the royal institute for deaf-mutes at Munich. *Münchener med. Wochenschr.*, No. 48, 1893.

4. Argentowski, B. Gellé's centripetal pressures. Their diagnostic and prognostic importance and their relation to other aural examinations. Zurich, 1893.

5. Urbantschitsch, Prof. V., Vienna. The possibility of attaining marked results by acoustic exercises even in such deaf-mutes, who have been heretofore considered as beyond hope. *Wiener klin. Wochenschr.*, 1893, No. 29.

6. Hecht, Lohnan. Clinical contribution to the use of cocaine in otology. *Munch. med. Wochenschr.*, No. 37, 1893.

1. Among 1030 patients, 73 requiring decidedly clinical treatment had to be treated at their residences on account of absence of an especial clinical department. Only the most urgent cases could thus be attended to. We emphasize from the report, that Lemcke expressly points to the examination and treatment of the nose and naso-pharynx in aural affections. Among 133 cases of acute otitis media the history and condition of 79, = 59.5 %, decidedly favored the assumption of the development of the aural affection from nasal and pharyngeal affections. In one case, the successful treatment confirmed the view, that "deaf-mutism is not quite unfrequently due to curable diseases of the sound-conducting apparatus as primary causes, and that beginning deaf-mutism may be retarded, reduced, and restored to the former condition by proper treatment." Rumler (Berlin).

2. 1662 patients were treated. At the stationary clinic 185 patients were cared for. The hammer was excised from the external meatus in 26 cases; the incus together with the malleus in 17. Among 9 mallear excisions, 5 were permanently cured; among 17 malleo-incudal extractions, 8. In two cases, the stapes was extracted together with the malleus without appearance of vertiginous or other unfavorable signs. The histories of six lethal cases are fully reported and also those of some interesting cases.

RUMLER.

3. The investigations made under the most careful precautions attempted only the determination of eventual remnants of hearing power in deaf-mutes. This can only be made with BEZOLD'S well-known continuous series of tones. The examinations were made only as to aërial conduction on account of the incapability of most deaf-mutes of distinguishing the sensation of vibrating from that of hearing. Among 158 hearing organs, 48 were totally deaf (15 individuals only bilaterally); among 28 the extent of hearing was limited to small continuous distances of the scale: "islands" (group I.); among 20 "tone-gaps" were found (defects within the continuity of the scale), viz., 16 plain and 4 double ones; multiple tone-gaps could not be positively demonstrated (group II.); in one case the entire upper range down to $g^2$ was missing, with perception preserved in the lower (group III.); in 8 cases defects were found simultaneously at the upper and lower tone limit (group IV.); in 18 cases, large defects at the lower, inconsiderable ones at the upper part (group V.); in 33 cases, also inconsiderable defects at the upper, but no very large ones either at the lower end, of from 4 to ½ octaves (group VI.). From the total synopsis of the groups it follows, that defects are more frequent and extensive at the lower end of the scale than at the upper.

MÜLLER (Stuttgart).

4. The dissertation made under the guidance of F. Rohrer of Zürich, begins with entering fully into the discussions of the methods and effects of centripetal pressures upon the healthy ear and of Gellé's different attempts at explanation. The second part communicates the results attained by Rohrer in 375 aural patients examined in this direction for aërial and bone-conduction. From the extensive and tabulated experiments it follows, that in all examined forms of disease (viz., in those of the labyrinth and also of the middle ear) the contripetal pressures have in more than 50 per cent. the same positive result as in the normal ear,

viz., they decrease bone- and aërial conduction. In primary labyrinthine affection 73.6 per cent., in "sclerotic processes" 51 per cent., Gellé's experiment, decreased simultaneously both aërial and bone-conduction. In primary affections of the labyrinth, the pressures produced changes only in 11.1 per cent., in sclerotic processes in 8.6 per cent. The greatest percentage of missing reaction was found in adhesive processes, viz., 27.8 per cent. against large percentages of entirely or partially missing reaction in labyrinthine affection. In the third part, the results of Webers', Schwabach's, and Rinné's experiments and of the examination of the upper tone limits are tabulated for the different forms of disease with reference to the result of the centripetal pressures. The results communicated in the second part, as it results from the above-mentioned figures, can hardly be considered as proof for the conclusions of the author, that the negative result of Gellé's experiment—if the mobility of the membrana tympani is supposed to be preserved—indicates fixation of the stapedial plate. It is, however, quite worthy of consideration in this direction, as emphasized by the author, that, on the one hand, the cases with negative Rinné and, on the other hand, those with negative (viz., without reaction) Gellé are approximately (100 : 90.5) the same. SIEBENMANN.

5. Methodical acoustic instruction may teach deaf-mutes : (1) how to separate and interpret acoustic impressions, and (2) how to excite their acoustic activity by which a gradual increase of perceptibility is rendered possible. URBANTSCHITSCH orders in the beginning acoustic daily exercises of half an hour's duration, later on of at least one hour, if possible, without hearing tubes. The sound transmitted to the ear ought to be only of an intensity that is absolutely necessary for the production of the corresponding acoustic excitation. POLLAK (Vienna.)

6. Auto-observation of a colleague, not an aurist; after two instillations of a 5 per cent. solution of cocaine, deafness, which had suddenly appeared five days previously with subjective noise, was completely removed. In conjunction with this observation, the author quotes the communications of M. von Stein and Kiesselbach on the use of cocaine in otology. MÜLLER.

## INSTRUMENTS AND METHODS OF EXAMINATION.

7. SCHUBERT. A novel magnifying glass for the membrana tympani. *Arch. f. Ohrenh.*, vol. xxxvi., p. 79.

8. JANKAU, Munich. Otological contributions. *Wiener med. Presse*, 1893, No. 44.

9. CALDWELL, GEO. W. Transillumination of the accessory sinuses of the nose. *N. Y. Med. Journal*, Nov. 4, 1893.

10. PHILIPPS, WENDELL C. A modified electrical head illuminator. *Medical Record*, July 8, 1893.

11. SCOTT, EDWARD A. An aseptic nasal speculum. *N. Y. Med. Journ.*, Dec. 9, 1893.

12. WINKLER, Bremen. Preliminary communication on a novel lamp for examination. *Münch. med. Wochenschr.*, No. 36.

13. WAGNER, R., Halle. The use of mirrors in rhinoscopia anterior. *Münch. med. Wochenschr.*, 1893, No. 10.

14. LIEVEN, Aachen. In-drawing of the alæ nasi in chloroform narcosis. *Münch. med. Wochenschr.*, 1893, No. 22.

15. RÉTHI, L., Vienna. A mirror for endo-nasal inspection. *Prager med. Wochenschrift*, 1893, No. 42.

16. BATES, W. H. New instruments for the removal of adenoid tissue. *Medical Record*, Sept. 2, 1893.

17. GIBBONS, PETER J. An adenotome for the removal of adenoid growths in the vault of the pharynx. *N. Y. Medical Journal*, Oct. 21, 1893.

18. BUTTS, H. HOYLE. A new instrument for controlling tonsillar hemorrhage. *Medical Record*, July 1, 1893.

19. GLEITSMANN, J. W. A multiple powder blower. *N. Y. Med. Journ.*, July 22, 1893.

7. In order to eliminate disturbing reflexes SCHUBERT inserted at the inner end of the aural speculum a plane convex lens, upon the plane surface of which a small glass prism is pasted. A double effect is thus reached: (1) the reflex of the plane surface is deflected by the prism and of no further consideration; (2) with the same refracting power, the radius of the convex surface in the plano-convex lens is rendered smaller by one half than that of a bi-convex lens, and, with the decrease of the radius, also the reflex image is smaller. RUMLER.

8. 1. An apparatus for auto-application of Politzer's air douche. A double balloon, the air-containing ball of which made of strong rubber, is by means of a rubber-tube provided with a stop-cock of wide calibre and an easily-working valve, the end attachment being olive-shaped in order to introduce it readily

into the nostril. With every turn of the valve at 180° an amount of air sufficient for the air-douche should pass. 2. Modification of Duplay-Chanièré's nasal speculum. Placing the screw backward. POLLAK.

9. The paper is a mere description of the method of transillumination, which is considered by Caldwell as one of the most valuable agents of diagnosis we possess.

M. TOEPLITZ.

10. The instrument carries a six-volt, four-candle-power lamp and is attached to a forehead metal band, which is held on the head by a steel band running sagitally. It resembles very much the illuminator as manufactured by Hirschmann at Berlin.

M. TOEPLITZ.

11. The instrument is so constructed, without-angles and furrows, as not to afford shelter to any impurity. The disadjustment is effected by simply pressing and then turning the retaining spring, after which the two handles are easily unlocked by approximation. M. TOEPLITZ.

12. The new lamp used for the first time the arc light for medical purposes; it can, therefore, be supplied only by an electric plant. It resembles Krause's lamp, and stands upon an iron stand with castors. The base rests upon a ball joint. The light, furnished by a small arc lamp of about 2 amp. intensity, is equal to from 150 to 200 normal-candles, and extremely steady. The lamp is manufactured by the firm of Schuckert at Nuremberg.

MÜLLER.

13. For inspection of the anterior portion of the nose, small mirrors, which are to be introduced into the nose, are recommended in suitable cases (illustration). MÜLLER.

14. LIEVEN, to prevent the alæ nasi from being drawn in, owing to the loss of volitional contraction and tonus of the mm. dilatatores and levatores, advises to supplement the outfit for narcosis by a nasal opener according to M. Schmidt or by a shirt button according to Schmidthuisen. MÜLLER.

15. The mirror devised by RÉTHI (manufactured by Reiner, Vienna, Franzensring 22), for introduction into the nose, is said to have the advantage that changes of position of the mirror can be made without exertion, gradually and equally and without jerks, that the mirror remains in a given position, and that the rod, in turning the mirror, does not jerk backward, thereby striking the septum. POLLAK.

16. The first instrument is of the shape of a Loewenberg forceps, but presents instead of the spoons, two conical ring-knives, which, when coming together, act like a pruning-hook and cut like a punch. The second instrument resembles a slender ear forceps with long arms and cutting blades as tips, similar to those of the first instrument, but smaller, and is introduced through the nose. M. TOEPLITZ.

17. The distal extremity of the instrument which is placed at right angles with the shank, resembles the knife and frame of Mackenzie's tonsillotome, whilst the proximal end works like Bosworth's porte-caustique. M. TOEPLITZ.

18. As a substitute for digital pressure BUTTS devises a tonsillar hemostat which measures six and three quarter inches in length and consists of two parallel steel blades four inches long, locked at the juncture with the handles. The tips of the blades are curved backward and outward, and hold ovoid pads for compressing the bleeding portions. The handles are connected by a threaded rod, upon which a milled wheel travels from the outside and a spring is inserted between the handles. A bibliography of forty-six tabulated cases concludes the paper.

M. TOEPLITZ.

19. The instrument, a modification of Politzer's powder blower, has three movable cups on a stationary canula, with which they communicate when turned upward, so as to then allow the powder to fall through. By turning the cups downward, they can be used separately or combinedly. M. TOEPLITZ.

### EXTERNAL EAR.

19a TREITEL. Diphtheria of the external meatus. *Deutsch. med. Wochenschr.*, 1893, No. 52.

19a. A delicate boy, aged three, suffered from pharyngeal diphtheria. There appeared, in addition, membranes at the angles of the mouth and nose, extreme cervical glandular swellings, and paralysis of the right facial. After a few days, both external meatuses were found to be filled with a thick, whitish membrane, which came off spontaneously as a perfect cast of the cartilaginous external meatus. The middle ear was apparently intact. The examination of the membrane for bacilli of diphtheria resulted in bacilli resembling them, but culture experiments were without success. The author does not doubt it to have been a case of genuine diphtheria. NOLTENIUS (Bremen).

### MIDDLE EAR.

20. Kossel, H. Suppurations of the middle ear in infants. *Charité Annalen*, vol. xviii. (From the Institute for Infectious Diseases at Berlin.)

21. Grunert, Halle. The cause and importance of retention of pus in the ear.

22. Weil, E., Stuttgart. Purulent otitis media. *Württemb. Correspondensbl.*, 1893, No. 25.

23. Cohen-Kysser, Hamburg. Contribution to the treatment of deafness. Preliminary communication. *Münch. med. Wochenschr.*, 1883, No. 34.

24. Raoult, A., Paris. Perforations of Shrapnell's membrane. *Soc. d'édit. scient.*, 1893.

25. Lemcke, Prof., Rostock. Hyperostosis of the petrous bone in chronic aural suppuration and its relations to intracranial affections of aural origin. *Berl. klin. Wochenschr.*, 1893, Nos. 37 and 38.

26. Panzat, J. E. Osteomyelitis of the temporal bone as a complication of otitis media purulenta. *Annal. des mal. de l'oreille*, etc., 1893, No. 9.

27. Siebenmann, F., Prof. Further contributions to the etiology and treatment of cholesteatoma of the middle ear. *Berl. klin. Wochenschr.*, 1893, No. 38.

28. Habermann, Prof. Dr., Graz. Cholesteatoma of the middle ear. *Mittheilungen des Vereins der Aerzte in Steiermark*, 1893, Nos. 8 and 9.

29. Eitelberg, A., Vienna. Contributions to the extraction of the malleus. *Wien. med. Wochenschr.*, 1893, No. 28.

30. Meyjès, W. Posthumus. Treatment of progressive and stable deafness and chronic otorrhœa by removal of the ossicles. *Nederl. Tydschr. voor Geneesk*, 1893, i.

31. Grunert. Stacke's operation for exposing the cavities of the middle ear during the second year of its use at the royal aural clinic at Halle. *Arch. f. Ohrenheilk.*, vol. xxxv., p. 198.

32. Rohrer, F. Secondary periostitis of the mastoid process. *Arch. internat. di Rinologia*, etc., Barcelona, 1893.

33. Grunert. The body temperature after the mastoid operation. *Arch. f. Ohrenheilk.*, vol. xxxv., p. 178.

34. **Grunert.** Cured case of pyæmia ex otitide; ligation of the jugular vein; injections through the peripheric end and transverse sinus. *Arch. f. Ohrenh.*, vol. xxxvi., p. 17.

35. **Koch.** Some aural operations. *Berl. klin. Wochenschr.*, 1893, p. 45.

36. **Zaufal**, Prof., Prague. Demonstration of two cases of pachymeningitis suppurativa externa cured by trephining. *Prag. med. Wochenschr.*, 1893, No. 45.

37. **Zaufal**, Prof. E., Prague. Clinical contribution to the otitic pachymeningitis suppurativa externa. *Prag. med. Wochenschr.*, 1893, No. 50.

38. **Scheier.** Cerebral abscess after purulent otitis media cured by operation. *Berl. klin. Wochenschr.*, 1893, No. 36.

39. **Kretschmann**, Magdeburg. Contribution to the treatment of the otitic cerebral abscess. *Münch. med. Wochenschr.*, 1893, No. 29.

40. **Jansen.** Contribution to the knowledge of the deep-seated extradural abscesses in the posterior cerebral fossa, produced by labyrinthine suppuration. *Arch. fur Ohrenheilk.*, vol. xxxv., p. 291.

41. **Jansen.** Cerebral sinus thrombosis after suppuration of the middle ear. *Arch. f. Ohrenheilk.*, vols. xxxv. and xxxvi.

42. **Gendre** and **Beausenat.** Staphylococcus infection; otitis, meningitis, and arthritis suppurativa; broncho-pneumonia; death. *Bull. et mém. de la soc. méd. des hôp.*, 1892, No. 28.

43. **Schwidop.** A case of sarcoma of the base of the skull with secondary affection of the petrous bone. *Arch. f. Ohrenheilk.*, vol. xxxv., p. 39.

44. **Uchermann**, Christiania. Stacke's operation. *Norsk. Mag. for Laegevidenskab.*, 1893, June.

20. **Kossel**, at the autopsies of infants, found the tympanic cavity so frequently filled with purulent exudations, as to undertake the study of these otitides mediæ of infants from a large material of autopsies. In accordance with former observers, he thus arrived at the conclusion that the inflammation of the middle ear plays an important part in the most different diseases of infants. In 188 autopsies of children up to one year, exudations were found in the tympanic cavity in 85 cases. These inflammations lead but rarely to perforation of the membrana tympani

and are thus most frequently overlooked during the examination of an affected child. In a group of cases the inflammation of the middle ear was to be considered as a complication of an acute infectious disease of the air passages. The acutely affected child exhibited the symptoms of a catarrhal difficulty of the air passages with broncho-pneumonic foci in the lungs under high fever. The appearance in these cases of a micro-organism closely allied to the influenza bacillus is important; it was found in the exudations of the middle ear and also in the broncho-pneumonic foci, in pure cultures or by far preponderating over other bacteria, and it was designated by Kossel in accordance with R. Pfeiffer as pseudo-influenza bacillus. In the second group of cases, the children did not present acute symptoms, but the well-known picture of atrophy. The affection of the ear, at any rate, is here to be considered as an extremely important complication, even as cause of the occurrence that children, during the first development of atrophy, frequently cannot be saved even with the best nourishment and the most attentive care. The four observations of extensive thromboses of the venous sinuses of the cerebrum and a case of meningitis purulenta in otitis presents the close relations of the otitides of infants also to cerebral affections. Extensive œdema of the soft meninges was in most cases of otitis media considered as the immediate cause of death. The suppuration was bacteriologically examined in 38 cases. The above-mentioned pseudo-influenza bacillus was found in 19 cases, 9 times in pure cultures, 10 times with Fraenkel's diplococcus, 4 times with streptococci, twice with Friedlaender's bacillus, twice with staphylococci, once with bacillus pyocyaneus. Fraenkel's diplococci were found in 6 cases, bacillus pyocyaneus in 3, streptococci in 3, Friedlaender's bacilli in pure culture in 1, Fraenkel's diplococci and streptococci in 1, streptococci and Friedlaender's bacilli in 3 cases. The otoscopic diagnosis is, according to Kossel, rendered extremely difficult by the anatomical relations of the infantile ear. He succeeded only in older infants. Sudden rise of temperature, appearance of somnolence, violent crying, etc, and also permanent decrease of bodily weight, together with the absence of other symptoms of disease, should in infants direct the suspicion to the ear. Kossel has heretofore not instituted any therapeutic procedures (paracentesis).

AUTO-REVIEW.

21. Lecture delivered before the Medical Society at Halle.—

Purulent meningitis, otitic cerebral abscess, purulent sinus phlebitis with consecutive pyæmia are much more frequently, as is generally assumed, the consequences of neglected aural suppurations. Apart from the location of the hearing organ relative to the brain, particularly the retention of pus favors the development of these diseases. Retention of pus is favored in the first place by the anatomical structure of the ear and principally by the anatomical relations of the cupolar cavity. The pus retained therein will readily cause empyema of the mastoid process with its dangers, or it burrows a path through Shrapnell's membrane, or it passes through the tegmen tympani (congenital dehiscences) into the cerebral cavity. Apart from the structure of the middle ear, secondary furuncles of the external meatus, granulations, exostosis, hyperostotic stenosis, atresia, burrowing abscesses of the external meatus are of importance. Finally, there exists artificial retention, as it is principally incurred by powder treatment. The treatment of otorrhœa should direct its main attention to the prophylaxis of retention of pus. MÜLLER.

22. In the lecture delivered before the meeting of the physicians of Württemberg, WEIL fully dwells upon the modern views on acute otitis media purulenta, its prophylaxis and treatment. In discussing the prophylaxis he warns especially against the imprudent use of the nasal douche, of which he is so much afraid, as to forbid it to his patients. He ascribes an important part also to improper blowing of the nose. With reference to treatment, he warns against the aërial douche during the stage of inflammation and advocates early paracentesis. He cannot conceive why this operation is not practised more during the academical studies, for according to his views, its knowledge is more important than the great operations, resections, etc. He concludes with the discussion of the participation of the mastoid process.

MÜLLER.

23. The preliminary communication records the fact, that, for more than one year, in chronic atrophic catarrh of the middle ear and remnants of cured suppurations, inasmuch as connective tissue formations and tissue metamorphoses had been the cause of deafness, COHEN-KYSSER had made injections of artificial and natural stomach juice, papayotine, and a new ferment isolated from the latter, into the middle ear—for the digestion of these pathological products,—and that he has thus generally arrived at satisfactory results. He injects from the external meatus at two places, at the

upper posterior quadrant and above the short process; in defects of the membrana tympani instillations are sufficient. MÜLLER.

24. RAOULT'S paper is divided into three parts: an anatomical, etiological, and a clinical part. In the latter, the main complications of the suppurations of the attic are discussed: cholesteatoma and polypi. According to the author, the most frequent cause of suppurations is the catarrh of the Eustachian tube in consequence of acute inflammations of the nose and pharynx. The other causes are very rare and doubtful. The treatment consists in irrigations through the cupolar space by means of Hartmann's antrum tube with antiseptic fluids, extraction of the carious ossicles, curettement of the cavity.

GELLÉ.

25. Contrary to the view that hyperostosis of the petrous bone, frequently found in chronic suppurations, form a protective wall for the cerebrum and its meninges against the suppurative processes advancing from the middle ear and mastoid antrum, LEMCKE points to the danger of this complication. The hyperostosis is not found in all parts of the ear, but well-nigh exclusively at the mastoid process and in the external meatus which is stenosed. The products of suppuration must break through in the direction of the smallest resistance, viz., into the cerebral cavity, if the stenosed external meatus is still further obstructed by swelling or polypi. In support of his views, Lemcke quotes the histories of fifteen patients, in whom sclerosis and hyperostosis were found. All the patients had suffered from suppuration of many years' standing, and had been earlier or later associated with dangerous general symptoms. Lemcke describes the symptoms of osteosclerosis, which he recognizes as a serious and dangerous complication, as a, in a measure, uniform picture, as follows: The most marked indication is the contrast between the symptoms of a deep-seated inflammation and the normal result of examination of the mastoid process and the surroundings of the external ear. At the bottom of the external meatus osseous stenosis or swelling of the soft tissues are found, the latter principally at the upper and posterior wall. The drum-membrane is mostly perforated; there is caries in the tympanic cavity, the discharge not very copious, but very offensive. A cure can be effected only by timely operation. RUMLER.

26. PANZAT draws from his paper the following conclusions: 1. Osteomyelitis of the temporal bone may appear in acute, sub-

acute, or even in chronic form. It forms a frequent complication of the chronic purulent otitis media. 2. The development and comparative frequency of this disease is naturally explained by the fact, that the microbes of osteomyelitis are normally found in purulent otitis media. 3. From a clinical standpoint, there are known at present: *a*, a type of acute osteomyelitis, affecting the entire pyramid of the temporal bone, the mastoid process, or at least its inner portions, and even the adjoining part of the occipital bone; *b*, different kinds of acute or subacute osteomyelitis are limited to the anterior upper portion, or to the entire mastoid process, the osseous part of the external meatus, etc. 4. The prognosis depends upon the infectious nature of the disease. The subperiosteal or subdural abscesses, the phlebitis of the sinuses, and the septico-pyæmic infections are the natural consequences of osteomyelitis. As for other bones, trephining forms also for the temporal bone the foundation of the surgical treatment of osteomyelitis. GELLÉ.

27. This paper of SIEBENMANN is a reply to the Grunert's attack, a defence against his insinuations, and an amplification of Siebenmann's experience communicated in his former publication, "The radical operation of cholesteatoma." Necrosis and caries of the osseous walls of the middle ear, as concomitants of acute otitides mediæ, form one of the most frequent causes of cholesteatoma. Siebenmann observed among seventeen of his cholesteatoma cases quoted in his first publication, in five, old retracted osseous cicatrices of the mastoid, which were proven to have been due to an acute affection from scarlet fever, diphtheria, etc. Such osseous processes are of quite frequent occurrence from the period when the fully developed cholesteatoma is recognized, but they are rare as concomitants or consecutive phenomena. Siebenmann, therefore, urgently advises preventive measures in this sense, that, wherever in acute osseous affections of the mastoid extensive resections had to be made, the cavity should not be permitted to close without placing cutaneous flaps from the surrounding parts into the osseous opening. This procedure simultaneously accelerates the duration of healing. Siebenmann could directly observe and follow up the excentric, rapid growth of the cholesteatomatous cavity in several of his operated patients. There existed no growing of epidermal papillæ into the healthy osseous tissue, but the abnormally increased physiological process of pneumatization, which Siebenmann had

described in a former paper (*Correspondenzblatt für Schweizer Aerzte*, 1891). With reference to the treatment, at first, insufflation and irrigation with the antrum canula should, as a rule, be tried, before resorting to operation. This procedure leads with consistent, steady application, in a large fraction of cases, to definite recovery; in just as large or still larger percentage, the cavity may thus be dried for weeks and months. Grunert's assertion that the introduction of the antrum canula was impossible in a large number of cases, is in direct opposition to the experience of those who are familiar with the use of the instrument. The conclusion of the paper argues against the assertion that Siebenmann's operative procedures are neither novel nor necessary. He points to the history of Zaufal-Küster's chiselling off the posterior wall of the external meatus, and emphasizes the fact that, in this twisting in of pedunculated flaps, the hemming in of the concha wound, Thiersch's transplantation of the operative canal and sewing of the uncut flaps of the soft parts of the posterior wall of the external meatus to the outer skin had been first used and described by himself. This combination proves, as has been mentioned in his first paper, to be unnecessary in a thin corticalis; in deep-seated small cavities, however, it forms the only means of establishing surely and rapidly a persistent opening. In seven further cases of this kind, operated upon during the first half of the year 1893, Siebenmann's method has also been successful.

AUTO-REVIEW.

28. According to HABERMANN, cholesteatoma is hyperplasia of the epithelium of the external ear, which develops from chronic inflammations and grows into the cavities of the middle ear. With the persistence of inflammation, the hyperplasia continues in the propagated cutis, the superficial epidermic layers of which are continually thrown off, and are gathering in the cavities of the middle ear as onion-like, stratified, lustrous masses.

POLLAK.

29. Among 4 cases of strong young men, in which EITELBERG had extracted the hammer on account of chronic purulent otitis media, the otorrhœa ceased only in 1 case almost entirely within ten days. In the remaining 3 cases it persisted for months. Furthermore, Eitelberg reports favorable results in the sclerotic form of otitis media, which in several cases were not limited to the operated ear, but was evident in the other likewise diseased ear.

30. Several dozen cases of chronic purulent otitis media have been treated by **Meyjès** with excision of membrana tympani, malleus, and incus, or drum-membrane and malleus only, after the ordinary means had been without success. They were mostly pure cases of "attic" disease, in which the hearing, as a rule, was still fairly well preserved, unless the membrana tympani was entirely destroyed and the malleus, much retracted, was fixed by fibrous bands in the tympanic cavity. Scraping of the tympanic cavity, principally of the promontory, stopped the suppuration when the ossicles were absent. Increase of acuteness of hearing and improvement of tinnitus were marked after removal of the firmly attached malleus, with the stapes pushed inward by the likewise attached incus. The passage between the tympanum and the attic being thus improved, otorrhœa ceased much more rapidly. The results of the removal of the malleus in sclerotic cases were much less favorable; the author, however, attained in 2 cases increased sensibility for noises.

AUTO-REVIEW.

31. The seat of predilection for caries was found to be the floor of the tympanic cavity and the aditus ad antrum. The operations were performed according to Panse's method. With reference to the success of Stacke's method, there were, among 43 cases published in this paper, 24 recoveries ( = 56 per cent.); 7 cases remained under treatment, 5 withdrew from treatment, 6 were discharged as not cured, and 1 case died (not in consequence of the operation). The duration of the required after-treatment varied between 1½ and 11 months; the average duration was 4½ months. Among 57 cases published by Panse, recovery could be verified in 20 cases by later examinations; relapses of suppuration took place in 4 of his first successful cases, in one of which recovery subsequently ensued. Fifty-three of 100 operated cases have thus heretofore been cured altogether. The hearing power, upon the whole, appears after complete recovery to be the same as before the operation.

RUMLER.

32. **Rohrer** draws the attention to conditions which resemble œdema and glandular swellings in the surroundings of the auricle. He observed "secondary periostitis" in 59 cases of his own practice, viz., "as consequence of inflammation of the external and middle ear or of the mastoid process." Three histories of cases for illustration of these etiological agents and also

of the therapeutic value of warm applications conclude the paper. SIEBENMANN.

33. GRUNERT studied the measurements of temperature in 214 cases from the aural clinic at Halle, in which mastoid operations were to be performed, and investigated whether points of practical importance could be gained from this synopsis. He found, in accordance with former observers, as the most important result, that no inferences could be made from the absence of fever as to the absence of disease of the mastoid process; for in 8 cases of acute suppuration with empyema of the mastoid without caries, there existed fever before the operation in 4 cases only, and, in 20 cases of acute otitis media suppurativa with caries without formation of abscess in the surroundings of the ear, no fever before the operation in 16 cases. A similar relation was found in cases of chronic suppuration. RUMLER.

34. Curetting of adenoid vegetations was followed in a child, aged ten, by violent inflammation of the left ear which, despite early paracentesis, did not attack the mastoid cells, but directly the adjoining cerebral sinus. Six days subsequently to the opening of the mastoid, exposure and opening of sinus, ligation of jugular vein, removal of purulent thrombi from the jugular and lateral sinuses by irrigation from the vein with a solution of 0.75 per cent. of sodium chloride under moderate pressure. Favorable course, no pyæmic phenomena, cure of aural affection. GRUNERT recommends irrigation through the sinus for thorough removal in purulent disintegration of thrombus. It is of interest that the child was seized with additional inflammation of the right ear upon second operation for removal of adenoid vegetations, which necessitated the opening of the mastoid. RUMLER.

35. At Prof. Koehler's department of the Charité were operated: 1. A case of foreign body in the middle ear and cholesteatoma of recent origin. After the right mastoid antrum of a woman had been opened twenty-eight and eleven months previously the posterior wall of the external meatus had to be chiselled off for removal of a jet pearl from the middle ear. The removal was successful. An osseous bridge only was found between the membranous meatus and a firm band of connective tissue, which leads from the old scars of the mastoid down to the bottom of the cavity. The band is continued by a membrane 1 *mm* in thickness, which lines an empty cavity of the size of a hazel-nut.

The membrane reached anteriorily the aditus ad antrum. It is completely removed with the sharp spoon. From the history of the case, Koch concludes that cholesteatoma in developing can disintegrate bone to a considerable extent. 2. A case of extensive primary ostitis granulosa of the petrous and temporal bones. In the robust patient the lungs were found to be normal, nowhere in the bone caseous places, and no tubercular structures in the granulations. 3 A case of extensive tubercular formation of sequestrum in a consumptive. It is noteworthy that, despite total destruction of the horizontal semicircular canal close to the antrum, no vertigo, disturbances of gait or equilibrium were noticed. 4. Cerebellar abscess. "A case of caries of the middle ear, in the course of which vomiting, persistent constipation, mental disturbances, consisting in weariness and loss of interest, continuous normal temperature exist, forcibly points to the diagnosis of a cerebellar abscess, if these symptoms continue after thorough chiselling of the mastoid. Still, the diagnosis has not been made, since too much stress has been laid upon the simultaneous pregnancy of three months' duration." 5. Cerebellar abscess with sinus thrombosis and basal meningitis. Rumler.

36. The first case was caused by otitis media suppur. acuta, the second by otitis media suppur. chron. In both cases the cranial cavity, the entire mastoid process, the lower portion of the planum temporale, and the anterior portion of the occiput were extensively opened. Chiselling off the entire mastoid process, the temporal line, the lower portion of the squama, together with the tegmen antri mastoidei down to the dura mater. In exposing the dura mater, thick, yellow pus was discharged from the subdural space.. Pollak.

37. Zaufal reports his lecture delivered at Nuremberg on the case of an unusually extensive, extra-dural abscess of the right side in consequence of otitis media sine perforatione of one year's duration. Pollak.

38. The patient was treated by Koerte in 1891. It is worthy of note, that during the first operation, apart from suppuration of the mastoid cells, an extensive subdural abscess was found, which was extensively exposed by chiselling off the bone. Sixteen days subsequently comparatively good conditions, no rise of temperature, pulse regular, no symptoms of recovery, marked mental depression, and abnormal increase of hunger. A cerebral abscess corresponding to the gyrus parietalis inferior, of the size of a

chicken's egg, was accidentally discovered and opened. SCHEIER assumes that this abscess had developed after the opening of the skull. After the operation the voracious appetite and melancholia disappeared. Rapid recovery took place, so as to enable the patient to leave the hospital with an osseous defect of the size of a German dollar. Recovery has persisted these two years, and the patient is well able to work. RUMLER.

39. Lecture before the German Otological Society, at Frankfort-o-M., is reviewed at another place of these ARCHIVES.

40. JANSEN, from his experience, and principally from a fully reported case of a deep-seated, extra-dural abscess with recovery, arrives at the conclusion : "That in cases with negative result of examination of the mastoid process and antrum, with other indications of a deep-seated focus of suppuration in the temporal bone, it is advisable to think that, apart from a deep-seated cerebral abscess, a deep-seated extra-dural abscess after perforation through the upper or lower vertical simicircular canal may exist, despite an intact dura in the region of the sigmoid sinus. In such cases it may be worth while to attribute increased importance to fistulæ of the medial wall of the antrum, to follow them without fear, or eventually to remove the posterior upper edge of the petrous bone. The opening of the vestibule from the horizontal semicircular canal, and from the medial wall of the antrum respectively, is, as in my case, an event not to be dreaded in such cases of labyrinthine suppuration with meningitic irritation, but is, on the contrary, desirable, and, in suitable cases, even to be established." RUMLER.

41. "The paper is based upon those cases of the material of the R. aural clinic at Berlin, in which (1), the diagnosis was ascertained by autopsy ; (2), by operation ; (3), one case of recovery was without this confirmation, but with a clinical picture of great distinctness. According to the same principles, the material found in literature within my reach was used but I limited myself to otitic sinus-thrombosis." The number of reported cases is 42. Of the thrombosis of the sinus transversus, 34 cases were observed in 33 patients. The paper is very thorough and treats fully of all pertinent questions, principally with reference to treatment. Its study is, therefore, urgently recommended.

RUMLER.

42. A man, aged forty-seven, of robust health, was seized with violent hemirania ; on the following day intense pain in the

right ear, which was followed on the subsequent day by copious discharge of pus from the same ear. Simultaneous appearance of deliria, 40.4° C. on the fourth day. Symptoms of meningitis and broncho-pneumonia. On the sixth day, pain in the right knee, which swelled rapidly, and, on incision, discharged half a glass of yellow pus. Death on the ninth day. At the autopsy, staphylococcus aureus only was found in the suppurations of the ear, meninges, and knee-joint. GELLÉ.

43. Exact description of the clinical and post-mortem examinations. The case was observed in a man, aged thirty, who had suffered in his twelfth year of age a severe injury to the cervical vertebral column, leaving permanent moderate stiffness in the nape of the neck. At the aural clinic at Halle, at first, tuberculous ostitis of the atlanto-occipital joint, was diagnosed and the patient, therefore, placed into Glison's extension sling. The disturbances, however, were thereby considerably increased. The symptoms of a malignant tumor of the base of the skull gradually became more marked; death ensued through paralysis of the tenth. At the autopsy the two uppermost cervical vertebræ exhibited their complete destruction by the tumor—spindle-celled sarcoma and also that of the pars basilaris ossis occipitis and of the sphenoid body. The tumor extends laterally principally toward the right side. The temporal bone was not carefully examined. RUMLER.

44. UCHERMANN delivered before the Medical Society of Christiania at its meeting in February, a lecture on the different mastoid operations, principally Stacke's and reported the results of 61 mastoid operations made at the university clinic during the previous year 1892, among which were 16 Stacke operations, partly primary, partly as after-treatment of Schwartze's operation. The youngest individual (Stacke) was one year old. The results were favorable, no fatal issue. The simple Stacke operation was soon abandoned, since in most cases complications with antrum disease existed. It was found much easier, not to detach the external meatus from the anterior wall; it suffices to detach it from the posterior wall and push it forward with a spatula (Wolff). Chiselling is then done from without inward (Küster, Schwartze), until the antrum and recessus epitympanicus are reached, sparing but the inner, lower half of the anterior wall of the external meatus. A "protector" is not necessary. The cavity is plugged from the external meatus and also from the

autrum and is kept open. Uchermann does not recommend sewing up the wound. UCHERMANN.

### NOSE AND NASO-PHARYNX.

48. HOVORKA, OSCAR, Vienna. Contribution to the anatomy of the external nose. *Wiener med. Presse*, 1893, No. 36.

49. MAYER, EMIL. Complete occlusion of both nostrils at the external orifice. *N. Y. Eye and Ear Infirmary Reports*, vol. i., p. 1, Jan., 1893.

50. NEWCOMB, JAMES EDWARD. Electrolysis for the relief of certain morbid conditions of the nasal septum. *N. Y. Med. Rec.*, Aug. 5, 1893.

51. RICE, CLARENCE C. The use of ozone in atrophic catarrh. *N. Y. Med. Journ.*, Aug. 19, 1893.

52. HAYNES, IRVING S. Ozone in the treatment of diphtheria. *N. Y. Med. Journ.*, July 15, 1893.

53. BREWER, GEO. E. The hæmostatic value of peroxide of hydrogen. *N. Y. Med. Journ.*, Dec. 23, 1893.

54. MYLES, ROBERT C. Exostosis and necrosis of the vomer. N. Y. Pathological Society, Sept. 27, 1893.

55. EULENSTEIN. Fibrinous exudations upon the nasal mucous membrane. *Deutsche med. Wochenschr.*, 1893, No. 36.

56. SPITZER, FRANZ, Vienna. The impermeability of the nose and its treatment. *Centralblatt für Therapie*, 1893, Nos. 7 and 8.

57. ROE, JOHN O. Reflex epilepsy from intranasal disease. Pan-American Medical Congress, Section in Laryngology, Washington, Sept. 5, 1893.

58. BRESGEN, Frankfort-on-Main. Headache in nasal and pharyngeal diseases. *Münch. med. Wochenschr.*, 1893, No. 5.

59. SCHEINMANN. Habitual headache a main symptom of various nasal diseases. *Berl. klin. Wochenschr.*, 1893, Nos. 49, 50, 51.

60. SCHEFF, GOTTFRIED, Vienna. New method of internal massage of the mucous membrane in chronic nasal diseases. *Therapeutische Blätter*, 1893, No. 7.

61. FREUDENTHAL, W. Internal massage in diseases of the nose and throat. *N. Y. Med. Rec.*, July 22, 1893.

62. HERZOG, MAXIMILIAN. Tuberculosis of the nasal mucous membrane. *Am. Jour. Med. Sciences*, Dec., 1893.

63. **Farlow, John W.** Two cases of nasal tuberculosis. *N. Y. Med. Jour.*, Nov. 4, 1893.

64. **Keiper, George F.** A case of nasal hydrorrhœa. *N. Y. Med. Jour.*, July 22, 1893.

65. **Mulhall, J. C.** Rhinitis œdematosa. *N. Y. Med. Jour.*, Oct. 14, 1893.

66. **Dunn, John.** A case of unilateral membranous rhinitis *N. Y. Med. Jour.*, Aug. 26, 1893.

67. **Cobb, F. C.** A case of angioma of the nasal septum. Pan.-Amer. Med. Congress, Washington, Sept. 6, 1893.

68. **Schroeder.** A case of so-called idiopathic acute perichondritis of the nasal septum. *Berl. klin. Wochenschr.*, 1893, No. 46.

69. **Lublinski.** Acute idiopathic perichondritis of the nasal septum. *Ibid.*

70. **Auton.** Contribution to the knowledge of congenital deformities of the nasal septum. *Arch. f. Ohrenheilk.*, vol. xxxv., p. 304.

71. **Moure.** Treatment of ozæna with concentrated pulverizations of nitrate of silver and chloride of zinc. *Bull. méd.*, Oct. 5, 1893.

72. **Grünwald**, Munich. Further contributions to the question of ozæna. *Münch. Med. Wochenschr.*, 1893, No. 43.

73. **Dunn, John.** Cured case of atrophic rhinitis. *N. Y. Med. Jour.*, Dec. 23, 1893.

74. **Richardson, C. W.** Report of a case of myxo-sarcoma of the nasal cavity. Pan.-Amer. Med. Congress, Washington, Sept. 6, 1893.

75. **Roaldes, A. W. de.** Cases of alarming epistaxis of grippal origin, and dangers of post-nasal plugging. *Med. Rec.*, Oct. 14, 1893.

76. **Schuster.** Contribution to the study of the suppurations of the nasal accessory cavities. *Deutsche med. Wochenschr.*, 1893, No. 38.

77. **Major, George W.** An improved method of draining the antrum of Highmore. *N. Y. Med. Jour.*, Aug. 19, 1893.

78. **Wolfenstein, Julius.** A case of acute empyema of the antrum of Highmore of nasal origin.

79. CALDWELL, GEORGE C. Diseases of the accessory sinuses of the nose. *N. Y. Med. Jour.*, Nov. 4, 1893.

80. SCHINDLER. Cerebral abscess in consequence of inflammation of the left frontal sinus. *Arch. de méd. milit.*, 1892, Sept.

81. MAYER, EMIL. Congenital occlusion of the right nostril posteriorly by a bony plate. *N. Y. Eye and Ear Infirmary Reports*, vol. i., p. 1, Jan., 1893.

82. WAGNER, CLINTON. Salivary calculi. *N. Y. Med. Jour.*, Nov. 11, 1893.

83. MEYJES, W. POSTHUMUS, Amsterdam. The removal of adenoid vegetations. *Nederlandsch. Tydschrift voor Geneeskunde*, 1893, No. 1.

84. DELAVAN, D. BRYSON. The ultimate prognosis in neglected adenoid hypertrophy. Pan.-Amer. Med. Congress. Section in Laryngology, Washington, Sept. 7, 1893.

85. NEWCOMB, JAMES E. The occurrence of hemorrhage for the removal of adenoid tissue from the naso-pharyngeal vault; with the report of a fatal case. *Jour. Amer. Med. Sciences*, Nov., 1893.

86. JOHNSTON, SAMUEL. A case of nasal polypus projecting into the naso-pharynx. *N. Y. Med. Jour.*, Aug. 5, 1893.

87. LOGAN, JAMES E. Sarcoma of the naso-pharynx. Pan.-Amer. Med. Congress, Washington, Sept. 7, 1893.

88. MEYJES, W. POSTHUMUS. Treatment of chronic pharyngeal catarrh. *Geneeskundige Courant voor Nederland*, 1892, Sept. 4th.

89. FISCHER, LEOPOLD. A case of tonsillar and uvular hemorrhage. *Deutsche med. Wochenschr.*, 1893, No. 42.

90. BRANNAN, JOHN WINTERS. Quinsy and its treatment by early incision. *N. Y. Med. Rec.*, Oct. 28, 1893.

91. SIMPSON, W. K. A case of sarcoma of the soft palate. *N. Y. Med. Jour.*, Oct. 28, 1893.

92. DUNN, JOHN. Case of sarcoma of tonsil. *N. Y. Med. Jour.*, Aug. 19, 1893.

93. PARK, ROSWELL. Primary sarcoma of the tonsil. *Med. Rec.*, Aug. 26, 1893.

48. HOVORKA lays down three fundamental forms of the nose: I. Deepened nose (concave); II. Straight nose; III. Curved

nose (convex). The anatomical conditions for these relations of form are caused by the structure of the nasal frame ; the different positions of the frontal processes of the upper maxilla, the form of the apertura pyriformis, the shape and position of the nasal bones, are the most determining agents. Pollak.

49. The patient, a woman, aged twenty-two, presented, apart from an active ulceration of the soft palate, which was destroyed in greater part, complete occlusion of both external orifices, of cartilaginous consistence, and of a thickness of $\frac{1}{32}''$, which was easily removed by the electric trephine. M. Toeplitz.

50. **Newcomb**, after explaining the nature of electrolysis, believes that projections, thickenings, and deviations of the nasal septum offer a fair field of success to this method. He then dwells fully upon the French literature of the subject, giving due credit to Moure and Bergonnié. He describes the technique of the operation at length, preferring the bipolar method. The advantages are bloodlessness and lack of reaction and adhesions, whilst painlessness is not always established. Newcomb treated two cases of deviation and bony ridges by electrolysis successfully, one of which, however, was followed by perforation of the septum. He believes that whatever can be done by electrolysis, can be accomplished by other means far more quickly.

M. Toeplitz.

51. **Rice** treated five cases of atrophic rhinitis with the smaller ozone generator of Labbé and Oudin, and three cases in conjunction with Dr. Morton by means of the large apparatus of the Ozone Manufacturing Company, applying ozone from five to eight minutes. The effect varied according to the amount used. Ozone produced smarting irritation and congestion of the mucous membranes for several hours, increased the secretions for eight hours, and lessened the dryness and odor for several days. Permanency of the results could not be obtained on account of the short duration of the trials. Rice applies ozone also locally on cotton in form of therapol (sweet oil and 8.75 volume per cent. of ozone). M. Toeplitz.

52. **Haynes** uses ozone in the form of therapol, applying it by cotton swabs to the pharynx and injecting it by small syringes in quantities of from 15 to 20 minims into each nostril. In addition he used chlorate of potash with iron and calomel fumigations. He reports seven recoveries. M. Toeplitz.

53. **Brewer** has observed the hæmostatic value of peroxide

of hydrogen in six cases, two of which are fully reported. The arrest of hemorrhage may have been also due to the lowering of the blood pressure. He explains the hæmostatic action of the drug from its disintegration of the red corpuscles and the resulting occlusion of the small vessels by their detritus, and also from the degeneration of the epithelial cells. M. TOEPLITZ.

54. The sequestrum, the rostrum of the vomer, was removed by forceps from the septum of a patient who had suffered from a bad odor for two years. The most delicate test for dead bone in the nose is, in MYLES's opinion, the cotton-wrapped probe.
M. TOEPLITZ.

55. EULENSTEIN, after reviewing the views and experience of other authors on rhinitis fibrinosa, gives such a case of his own observation in which plugging with iodoformed gauze proved so successful as to recommend this method for treatment. The paper concludes by summing up that (1) the appearance of pseudomembranes designated as rhinitis fibrinosa is not an independent disease produced by a specific microbe, but a picture of disease due to different effects, and that (2) fibrinous exudations following therapeutic cauterizations develop by the cauterization alone, without the additional action of a definite micro-organism.
NOLTENIUS.

56. A brief synopsis of the causes, consequences, and treatment of impermeability of the nose. POLLAK.

57. ROE arrives, among others, at the following conclusions: (1) epilepsy is a frequent result of peripheral irritation; (2) the susceptibility to peripheral irritation varies greatly in different persons; (3) the nose is frequently the seat of sufficient irritation to excite a variety of reflex manifestations, as central phenomena, in the form of epileptic convulsions or as peripheral ones of an entirely different character; (4) The nose exhibits well-defined sensitive areas, independent of the neurotic condition.
M. TOEPLITZ.

58. BRESGEN admonishes to lay more stress upon the fact that headache is a very frequent symptom of nasal and pharyngeal affections. The cause of nasal headache is a certain degree of swelling of the mucous membrane (which does not necessarily imply an obstruction of the air passage) in conjunction with a regularly or irregularly (by anomalies of septum) constructed narrow nose, principally in the region of the middle turbinate; furthermore, in suppurations, apart from swelling of mucous

membrane, retention of secretions, and denuded and inflamed places of bone (principally in the middle nasal meatus). With reference to the diagnosis, isolated places of the more or less swollen mucous membrane are, in the painless period, markedly sensitive to the touch of the probe; if headache is present, the swelling is more extensive and the region of the "pressure points" markedly red and sensitive. Bresgen holds, in the pharynx, principally the hypertrophy and suppurations of the pharyngeal tonsil responsible. The headache is here due partly to the never-missing participation of the nose, partly to the formation of crusts in the naso-pharynx. From the place of sensation of the headache, one can never draw an inference as to disease of a distinct place of the nose and pharynx, this being ascertained only by accurate examination, principally with the probe. Finally, Bresgen quotes those cases in which certain excitations (mental, sexual) cause swelling of the nasal mucous membrane, and thus also headache. He concludes with remarks on the treatment and admonishes, in every case in which no other cause of headache can be detected, to examine the nose and pharynx.

59. SCHEINMANN elaborately discusses the different nasal affections, causing headache and demands "an examination of the nose for local causes in habitual cephalagia of unknown origin."

RUMLER.

60. Upon the handle of a dentist's drilling engine Power's hammer armed with a nasal probe is placed. By the movements of the engine, successive, rapid strokes of the hammer occur, the intensity of which is, by an arrangement, increased or lowered according to requirement, and the probe is thus executing vibratory movements. The vibrations are uniform and do not require dexterity nor practice for their execution. POLLAK.

61. FREUDENTHAL devises for nasal massage an electric vibrator, consisting of a probe which is placed between two magnets and moved back and forward by the interruption of current, running through attached wire coils and metal plates. The probe makes almost 8000 vibrations per minute. Whilst massage is contra-indicated in acute cases, hypertrophies as well as atrophies of the nose and pharynx are claimed to have been cured and the duration of attacks of hay fever considerably shortened by this method. Freudenthal is not as optimistic as the originators of nasal massage (Braun, Laker), but he does not condemn it as Chiari does. M. TOEPLITZ.

62. HERZOG tabulates eighty cases from literature including ten fully reported cases, nine of which were taken from SEIFERT'S clinic at Würzburg and one from his own private practice. He arrives at the following conclusions: Tuberculosis of the nasal mucous membrane is comparatively rare, but not so rare as formerly supposed. It is generally secondary, but also primary (in 25 per cent.). It occurs in form of ulcerations, tumors (generally in primary cases), and a combination of both. It occurs at any age, preferably at the ages between ten and forty years. It is most frequently located upon the cartilaginous septum. It takes a very chronic course and relapses are the rule even after surgical interference. We highly recommend the careful perusal of the paper, which, in fact, forms a clear and exhaustive monograph of the subject. M. TOEPLITZ.

63. The first case exhibited in a lady, aged twenty-three, a chronic ulceration of the septum and lower turbinate with a vascular hypertrophy of the latter. The ulcer was long and narrow, extending over nearly half the length of the septum. In the second case, occurring in a lady, aged seventy-one, there existed an infiltration and enlargement of both sides of the septum; after the removal of which a perforation persisted. The microscopical examination of the removed portions of this case revealed the structure to be similar to that of miliary tubercle.

M. TOEPLITZ.

64. After exhausting all remedies KEIPER used a spray of atropine (gr. ii. to ℥ i.) with great success. M. TOEPLITZ.

65. MULHALL observed six cases of rhinitis œdematosa, acute and chronic, of intermittent character, with scanty serous discharge and swellings, migratory over the nasal cavities. The œdema was not affected by cocaine and was, in two cases, coincident with bronchial asthma. Two acute cases also presented icterus; in three cases existed biliousness, after the cure of which the œdema and asthma disappeared. Mulhall, therefore, calls it peptic œdema. Local treatment of the nose, especially in acute cases, should be avoided. M. TOEPLITZ.

66. A boy, aged five, with croupous tendency, developed after amygdalitis an occlusion of the left nostril produced by a whitish membrane, which filled the entire nostril and was withdrawn only under bleeding, but was easily detached each time after three returns by warm solutions of bicarbonate of soda. The affection, which was not attended by fever, may have been due to previous

irrigations of the nose with "dirty" water by a syringe. DUNN highly recommends bicarbonate of sodium as a cleanser even in acute coryza. M. TOEPLITZ.

67. The patient, an anæmic girl, aged sixteen, presented a small pedunculated growth at the junction of the skin and the mucous membrane of the septum of the right nostril, with hemorrhage and thick discharge from, and occlusion of, the same nostril. The soft growth was removed by snare, and did not recur. The microscopical diagnosis was cavernous angioma. This case is a very rare one. M. TOEPLITZ.

68. A girl, aged eighteen, was seized with fever and headache. The perichronditis had to be treated with incisions of the mucous membrane and curetting of the carious places. There existed no sign of tuberculosis or syphilis. RUMLER.

69. In this case the affection appeared in a diabetic patient aged sixty. It sufficed to make an incision on one side. RUMLER.

70. In order to ascertain the form and percentage of deformities the nasal septum of the new-born, AUTON examined systematically the nasal cavities in 56 autopsies of children. He found in 9 (16.07 per cent.) deformities, viz.: pure deviation, one case; with formation of spur associated with deviation of septum—eight cases. RUMLER.

71. MOURE attained in ozæna excellent results by daily insufflations of solutions of nitrate of silver of from 10 to 25 per cent. or of chloride of zinc of from 2 to 10 per cent. The treatment should be abandoned in too vehement reaction or too intense epistaxis. GELLÉ.

72. In the lecture delivered at the sixty-fifth meeting of German naturalists GRÜNWALD recently emphasizes, that the question of the cause of the formation of offensive crusts and that of the origin of secretions have to be separately considered, in order to be cleared up. A series of histories of cases furnishes further material for illustration of these points: three cases, in which the excellent result of treatment proved that the complex of symptoms was due to disease of accessory cavities (one recovery); furthermore, four cases, in which the improvement produced by the removal of adenoid vegetations, or of hypertrophied tonsils, respectively, furnish the proof for the causative importance of adenoid tissue in the pharynx for the complex of symptoms—cases which may be suitable to throw light on the spontaneous

cure of "ozæna." With reference to the atrophy, Grünwald emphasizes the necessity of distinguishing between atrophy of the mucous membrane and atrophy, or rather aplasia, of the bone, for the abnormal thinness of the osseous frame is not always, even rarely, of pathological origin. He denies the correctness of the conclusions which Hopmann derives from his measurements, which are not in accordance with his own. He considers, in accordance with Walb, the atrophy of the mucous membrane as secondary, caused by the pressure of the crusts. Grünwald then precisely defines the practical results arrived at by actual observation, referring to his former thesis, and he concludes, that "a causative diagnosis can in this disease be made only by causative treatment." MÜLLER.

73. DUNN reports a cured case of atrophic rhinitis, which had lasted ten years. He considers atrophic rhinitis as the result of chronic inflammation, originally purulent, of the nasal mucous membrane, the result of untreated purulent rhinitis of children. Purulent rhinitis is caused by infection. The cure of atrophic rhinitis is effected by the disappearance of inflammation and the cessation of formation of connective tissue. The interior of the nose is like a scar, in which the epithelium and underlying stratum has somewhat regenerated, of course, with destroyed olfaction and erectile tissue, and widening of the nasal spaces. Treatment consists of thorough cleansing, application of nitrate of silver, with subsequent neutralization, and of sublimate (1:1200).

M. TOEPLITZ.

74. The enormous growth, which filled out the nasal and pharyngeal cavities, had developed in a child, aged four and three-quarters, and had speedily returned after the first thorough removal by the snare. The second operation, performed according to Billroth's method of resection of the upper jaw, cured the child for four months. Death from relapse in the pharynx and the lymphatic glands of the neck. M. TOEPLITZ.

75. Of the four cases of epistaxis due to influenza reported by DE ROALDES, one occurred during the attack and the other three during its decline. All cases presented stenosis of the bleeding nostril, which, combined with grippal diathesis, caused the hemorrhage. Roaldes justly condemns posterior plugging on account of the severe aural complications, and advocates antero-posterior packing by long strips of iodoform gauze, after preliminary disinfection and cocainization. A complete bibliography is appended to the ably written paper. M. TOEPLITZ.

76. With reference to Grünwald's book, *The Study of Nasal Suppurations*, etc., Schuster, in opposition to Grünwald, pleads that specific nasal suppurations should be placed along those developed from other causes, since specific suppurations are not essentially distinguished from others. Schuster, at the same time, points out "that for many years he has also advocated the frequent application of the nasal probe, as Grünwald now does." Some histories of cases serve as illustrations. NOLTENIUS.

77. MAJOR has formerly found the antrum thirteen times diseased among 189 cases of myoxmatous nasal polypi, and recently, among eleven cases of antral disease, seven with nasal polypi. He usually operates from the alveoli with drills, $\frac{5}{32}$- and $\frac{3}{16}$-inch thick, in slightly oblique direction. A gold drainage tube is soldered to its base, a gold sheet, beaten out of metal according to a model taken from a plaster-of-Paris cast. The base is secured to the jaw either by a pair of arms if one tooth is wanting, or by a suction plate if several teeth are missing, or by false teeth when such are worn. The tube, through which injections of boric acid or alkaline antiseptic solutions are made, is closed by a rubber plug. M. TOEPLITZ.

78. WOLFENSTEIN reports his case on account of the rarity of acute empyemata and its nasal origin. He analyzes trans-illumination as to its relative value for diagnosis, and recommends mild measures (alkaline antiseptic washes) in acute cases before resorting to surgical procedures. M. TOEPLITZ.

79. The differential diagnosis between diseases of the antrum, frontal sinus, and anterior ethmoid cells may always be established by inspection, irrigation, and transillumination. Peroxide of hydrogen and exploratory puncture are unnecessary. The frontal sinus is enlarged from the infundibulum by the curette, also the anterior ethmoid cells with clipper and curette, and both are then irrigated. The antrum is temporarily opened by CALDWELL from the canine fossa, through which the cavity is thorougly cleansed, but the after-treatment is conducted from a counter-opening into the lower nasal meatus and the primary opening allowed to be closed. The posterior ethmoidal and the sphenoid cells are treated from their natural opening at the sphenoid, and are reached with considerable difficulty from the naso-pharynx by a hook-shaped knife. M. TOEPLITZ.

80. A soldier, aged twenty-one, was, in the course of coryza, affected with fever and cephalalgia, œdema at the root of the nose and the left upper eyelid. Trephining of the frontal sinus with

discharge of pus. Death ensued, nevertheless, during coma, with aphasia and monoplegia of the right arm. At the autopsy, a cerebral abscess was found in the second and third left frontal convolution. GELLÉ.

81. The complete occlusion, found in the right nostril of the female patient aged seventeen, was after removal of an ecchondrosis of the anterior part of the septum of that side, drilled through with the electric trephine at two places, and the respiration thus freely restored. M. TOEPLITZ.

82. WAGNER reports four cases of salivary calculus. The first and third cases were calculi of Bartholin's duct; the second was also a small one of Wharton's duct; the fourth calculus, the largest on record, weighed 93 grains, and was removed by Dr. James of London from the duct of Stensen. M. TOEPLITZ.

83. MEYJES uses, for removal of adenoid vegetations, Gottstein's instrument, suitably modified by Hicquet.

84. Adenoid hypertrophy, if left to itself, does not subside, but leaves (1) a degree of hypertrophy, (2) so-called Tornwaldt's disease, or (3) an atrophic condition of the vault of the pharynx. All these conditions may have not only local but also far-reaching effects upon other organs. M. TOEPLITZ.

85. NEWCOMB operated on an anæmic boy of strumous appearance, without history of hæmophilia, for adenoid vegetations, under ether, in supine position, and permitted the patient to go home after two hours. When called for after sixteen hours, he found the patient in a dying state. Death was due to exhaustion from slowly progressing hemorrhage. All diathetic conditions except the strumous had been excluded before operation. An analysis of all cases reported appears unsatisfactory as to tabulation and conclusions. The position and the instruments used had no bearing upon the hemorrhage. Newcomb advises the greatest possible care, even in the simplest surgical procedures.
M. TOEPLITZ.

86. The growth occurred in a female aged sixty, and was of about the size of a pullet's egg, two inches long and three quarters thick. It was attached by a narrow pedicle to the right inferior turbinated bone. A year after removal, another polypus hanging over the velum, almost touching the base of the tongue, presented itself. M. TOEPLITZ.

87. The tumor, twice as large as a partridge's egg, occurred in a man aged forty-four, and was inserted into the roof of the

pharynx. It was removed in nine operations with the cautery knife and subsequent applications of persulphate of iron to its base; it shrank considerably. The growth was a round-celled sarcoma.

M. Toeplitz.

88. In nearly all cases of pharyngeal catarrh, the author found that the cause of disturbances of speech should be looked for in: (*a*) extensive development of the so-called lateral bands, situated on the arcus palato-pharyngeus, (*b*) enlarged tonsils, principally with intense development of the follicles, (*c*) increased follicles of the lingual base. Cauterization with chromic acid led to complete recovery in the cases *a* and *c*; incisions into the tonsils, according to Moritz Schmidt, in the cases *b*, if removal of the enlarged portion by tonsillotomy is impossible. Insufflations of watery solutions of ichthyol of ½ %, applied by the patient every two hours, serve to promote rapid recovery. In many cases of so-called neurosis laryngis, the author asserts the presence of the abovementioned abnormities. In real neurotic cases the patients complain, as a rule, of disturbances of deglutition, not of speech.

Auto-Review.

89. A robust man, aged thirty-five, experiences in eating rye bread intense pain in the throat, with a simultaneous beginning of an arterial hemorrhage of long duration. Cause—a bristle, which was present in the bread, had pierced tonsil and uvula. The hemorrhage ceased after extraction of the bristle.

Noltenius.

90. The affection is most frequently located outside of the tonsil. Scarification of the tonsil only aggravates the condition. Early incision for the evacuation of pus, in most cases, gives immediate relief. The incision should be made at a point about midway between the base of the uvula and the upper alveolar process of the affected side. The danger of wounding the vessels of the neighborhood is not so great as it was anticipated by Holden, Gray, Cruveilhier, Quain, Leidy, and Tillaux, who place the vessels very close to the tonsil; on the other hand, according to Delavan and Zuckerkandl the tonsil is separated by the anterior part of the pharyngo-maxillary interspace from the internal carotid, which is behind it and 1.5 *cm* laterally from it. The stylo-glossus and stylo-pharyngeus muscles divide the pharyngo-maxillary space into an anterior and posterior chamber. If the soft palate is swollen, an incision of even 2 *cm* could not reach the carotids. In the four cases of Chassaignac, Duke,

Murphy, and Stanley of excessive hemorrhage after incision into or about the tonsil, injury to the wall of the carotid by the knife was proved not to have been the cause of the bleeding. In Duke's and Murphy's cases the internal carotid was eroded or ruptured by pus and the blood had freely escaped from the vessel, but was pent up in the pharyngo-maxillary space. BRANNAN collected 20 cases of erosion of large arteries due to faucial phlegmon, among which were 18 spontaneous openings. Four out of 7 ligations of the common carotid resulted in recovery. All but 1 of the remaining 13 cases died without ligation. Among 8 autopsies perforation of the internal carotid was found in 5, of the internal maxillary in 1, of a branch of the external carotid in 1 and of the tonsillar artery in 1 case. The erosion of the artery may be due to some additional general dyscrasia or an impaired state of the wall from previous inflammations, or perhaps to the septic character of the pus combined with pressure. The great majority of the patients were men. At the conclusion of this most valuable paper, Brannan advises an incision at the earliest possible moment through the soft palate (unless the pus points elsewhere), and, in great tension, even without formation of pus. There is no danger of wounding large vessels. In deep-seated abscesses, however, erosion of arteries may take place and the arterial hemorrhage should be immediately checked by pressure and subsequent ligation. M. TOEPLITZ.

91. The remarkable features of the case, occurring in a girl, aged sixteen, consisted in the first appearance of multiple tumors of the soft palate in 1889, which was reported by Lefferts in the *Transactions of the Amer. Laryng. Society* of that year as multiple papillomata, and in their subsequent transformation into a malignant growth. Sixteen months after the removal with flat scissors, the recurring tumors were removed by SIMPSON with the galvano-cautery knife and lactic acid. They rapidly returned and now lost their benign appearance, adding infiltration of the soft palate, which when removed by the knife proved to be sarcomatous. Two months later more extensive recurrence took place, and death ensued two years and a quarter after the first appearance of the apparently benign growth. The cautery and lactic acid may have favored the change into malignancy. M. TOEPLITZ.

92. DUNN gives a full and elaborate report of a case of sarcoma of the right tonsil which he had observed for over ten months in a lady aged fifty. The sarcoma gradually travelled from the right ulcerated

tonsil through the pillars, into the soft palate and uvula on to the base of the tongue, into and beneath the aponeurosis of the pharynx, into the cheek, in the lower jaw and gums. The lymphatics were not permanently swollen during the first six months. The growth presented in all affected portions a cheese-like consistence with tendency to ulceration. It did not bleed, even after extensive removal. There existed neither marked salivation nor marked pain. Complete removal was not attempted and the treatment consisted of antiseptic washes and partial removal.

M. TOEPLITZ.

93. The two cases of PARK occurred in males, aged fifty-eight and thirty-one respectively. Both cases were operated on according to Mikulicz's method, but without resection of a portion of the lower jaw, which was divided and reunited by metallic sutures, and without division of the hypoglossal nerve. The first patient has thus far remained well for two years and a half after the operation. The second patient, whose other (right) tonsil was involved, died four days after operation. The tumors of both patients were round-celled sarcomata. M. TOEPLITZ.

### NERVOUS APPARATUS.

94. HERDMANN, J. Clinical observations as to the function of the right temporo-sphenoidal lobe. *Journal of Nervous and Mental Diseases*, 1893, xviii., p. 612.

95. LÉRIEUX, P. A case of pure word deafness. *Rev. de méd.*, Aug. 10, 1893, p. 733.

94. In a case of loss of hearing and taste, apart from other symptoms, there was found a hemorrhagic focus in the anterior portions of the right temporal lobe. ASHER.

95. *Gradual* development of word-deafness in a woman aged fifty-one, without word-blindness, with motor aphasia or agraphia. Hearing in the left ear entirely normal ; in the right, in consequence of chron. otit. media, considerably changed. Repeated assurance of the patient, that she hears, but does not understand the words ; there existed also musical amnesia. Whistling and bird-song could be distinguished with difficulty from the human voice. Things of every day's occurrence, when written, are understood. Visual impressions normal ; memory and intelligence undisturbed. Gradual increase of the phenomena. Complete word-deafness after a slight apoplectic attack. The words are now, in writing

from dictation, incoherent and unintelligible. She can read with loud voice without understanding the context. Spontaneous speech and writing more incorrect than formerly. Cessation of paraphasia. Probable diagnosis: Injury to the subcortical acoustic paths. Moos.

# REPORT ON THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION, HELD AT BRISTOL ON AUGUST 1ST, 2D, AND 3D.

## SECTION OF LARYNGOLOGY AND OTOLOGY.

By Mr. HARSANT, of Bristol, Secretary.

Dr. McBride, of Edinburgh, presided, and made a few observations on recent progress in otology, alluding especially to the surgical treatment of suppurative ear disease.

A discussion on the prognosis of chronic non-suppurative otitis media with imperforate membrane was opened by Mr. G. Field, of London. He included under this designation the acute and chronic catarrhs of the Eustachian tube, as well as chronic catarrhs of the middle ear. Among *unfavorable* conditions he would include a long duration of the symptoms, mentioning six months to one year as the limit within which we can reasonably hope to restore perfect hearing; a general constitutional cause rather than a local one as the origin of the malady; also cases following exanthemata he considered unfavorable, as well as cases with an hereditary predisposition. Occupations exposing the subject to the influence of the weather, and a slow and insidious commencement, were among other unfavorable conditions, while the converse conditions were *favorable*. He considered prognosis most favorable in children and young adults, in whom the cause is plainly attributable to local and removable obstruction, naso-pharyngeal or faucial abnormalities, or to simple mucous obstruction of the Eustachian tubes. The prognosis is unfavorable where, with much deafness, there is no improvement whatever after forcible catheterism, dilatation of the Eustachian tube, removal of secretions, or the intra-tympanic injection of solvents. The prognosis is absolutely bad where the symptoms point to primary sclerosis, and worst of all where the tuning-fork tests point to serious labyrinthine disturbance.

Dr. **THOMAS BARR**, of Glasgow, read a paper on the same subject. Among the varieties of the affection he considered the painless exudative inflammations the most hopeful, while the painful exudative forms were not so hopeful. The non-exudative varieties he considered much less favorable as regards prognosis. The more marked the objective changes found in the ear, the more favorable are the prospects of improvement.

The absence of improvement after a single act of inflation must be looked upon as an unfavorable omen. He did not consider that accompanying labyrinthine disease always meant an unfavorable prognosis, but the presence of the phenomenon of hearing better in a noise, which indicates stiffening of the ossicles, must be regarded as unfavorable in a prognostic point of view, although it does not exclude all chance of improvement.

In the discussion which followed the reading of these papers Dr. **DUNDAS GRANT** said he divided cases of non-suppurative catarrh into three classes :

1. Those in which there is evidence of Eustachian obstruction and improvement on inflation, in which the prognosis is relatively favorable.
2. Those in which there is no evidence of Eustachian obstruction and no improvement on inflation, in which the prognosis is unfavorable.
3. Those in which there is evidence of Eustachian obstruction, but little or no improvement on inflation. In these the prognosis is intermediate between the two others.

He considered that the element of sex had something to do with prognosis. The most intractable cases were met with in young women. He had found anæsthesia of the membrani tympani a bad omen, indicating a tropho-neurosis.

Mr. **LENNOX BROWNE** was pleased to observe that the word "catarrh" was omitted from the subject title, and regretted to find it introduced so frequently into the opening remarks. In his opinion the one great indication in the treatment of middle-ear deafness was to remove all nasal obstruction, and if this were done he considered the prognosis favorable, but all methods of treatment by inflation were worse than useless until the patency of the nasal passages was established.

Dr. **KERR LOVE**, of Glasgow, considered the chief difficulty to be to distinguish between the various forms described by Dr. Barr as exudative, interstitial, etc. He had found that if inflation for a period of three weeks produced no improvement, the prognosis was generally unfavorable.

Dr. WALTER DOWNIE alluded to the failure of pilocarpine in these cases, and spoke of the importance of establishing free nasal breathing.

Dr. PERMEWAN thought that inflation should be persevered with for six months before forming a hopeless prognosis. He did not think it probable that a long-continued inflation was likely to do harm.

Dr. WILLIAM HILL considered the presence of soft obstructions in the nose and naso-pharynx influenced prognosis to the extent that in advising operative treatment we were justified in giving the patient more hope of relief in this condition than in the case of hard, rigid obstructions, such as spurs or deflections of the septum. He advocated the use of the Eustachian bougie in bad cases.

Dr. McKENZIE JOHNSTON, of Edinburgh, considered the prognosis to be mostly bad in the very chronic cases, especially in those cases of dry catarrh met with in young females. The prognosis was most favorable in obstructive cases.

Dr. H. KNAPP, of New York (who was called upon by the President), thought the prognosis depended on conditions which the patient presented when first seen by the physician. Cases which were caused by adenoid growths or nasal disease could be benefited by the removal of these causes even long after the deafness had been set up. He alluded to two recent methods of treatment, both depending upon the surgical principle of treating stiff joints by forcible movements. The first was the *electric vibrophone*, which, during the last year, had been much spoken of in America, and the second was the *pressure probe* of Professor Lucae, of Berlin. He gave a description of the latter, which he had lately seen applied by Professor Lucae in two cases, with very great improvement of the hearing power.

Dr. PEGLER spoke of the benefit derived from using a self-inflator, and considered that the bad results sometimes observed from over-pressure were avoided by the use of this instrument. He had found encouraging results from the use of solutions of menthol in paroleine.

Dr. MILLIGAN, of Manchester, drew an important distinction between cases where catarrhal and exudative changes predominated, and those in which adhesive products were formed as the result of the pathological process. The latter were the more unfavorable as regards prognosis. He had formulated for his own guidance the following hypothesis: "The amount of hearing which can be estimated to that in any given case after successfully inflating the middle ear, can generally be maintained provided treatment be efficiently carried out."

THE PRESIDENT summed up the discussion in a few well chosen words.

Dr. JAMES KERR LOVE, of Glasgow, read a paper on "Deaf-Mutism as a Clinical Study," which was discussed by Dr. Dundas Grant, Dr. Bennett, Dr. Warden, Mr. Harsant, and Dr. McKenzie Johnston.

Dr. THOMAS BARR, of Glasgow, read a paper on "Excision of the Malleus as a Preliminary Operation to Opening the Antrum in Cases of Suppuration from the Attic and Antrum." Some observations on this subject were made by Dr. Knapp and Dr. Milligan.

Dr. DUNDAS GRANT read a paper "On a Better Appreciation of Rinné's Test, the Aëro-Osseal Difference."

Dr. WALTER DOWNIE read a paper "On the Care of the Ear during the Exanthemata," which was discussed by Dr. McKenzie Johnston and Dr. Barr.

Papers by Dr. MILLIGAN on "Excision of the Ossicula Auditus in Chronic Suppurative Otitis Media," and by Mr. HARSANT, of Bristol, on "The Hearing Power of Deaf-Mutes," were not read owing to want of time.

A cordial vote of thanks to Dr. McBride, for the able and impartial way in which he had conducted the proceedings, closed a very successful meeting.

# Book Reviews.

---

**Thrombosis of the Lateral Sinus Due to Purulent Otitis Media and its Operative Treatment.** By ARTHUR AF FORSELLES, Assistant Surgeon at the Surgical Clinic at Helsingfors. Knopio, 1893. Published by C. W. Backmann. 125 pages, with numerous tables. Reviewed by S. Moos, Heidelberg. Review translated by M. TOEPLITZ, New York.

Ever since Zaufal first proposed and proceeded to operate thrombosis of the lateral sinus, this operation has been frequently and successfully performed. This otitic complication has become of so much greater interest, as, despite the great number of the heretofore published cases, and despite the excellent paper of Jansen (*Arch. f. Ohrenheilk.*, vol. xxxv.), Hessler (Schwartze's *Handbook*, ii.), A. Lane ("The Symptoms and Treatment of Septic Infection of the Lateral Sinus as Illustrated by Ten Cases," *Brit. Med. Journ.*, 1893, September 3d, p. 561), O. Koerner ("The Otitic Diseases of the Cerebrum," etc., Frankfort on the Main, 1893), and Wm. Macewen, the assertion made by Griesinger thirty years ago still holds good: "The diagnosis of thrombosis of the lateral sinus remains, at any rate, but a diagnosis of probability." The aural specialist will therefore welcome a monograph which elaborately and fully treats of the study of thrombosis of the lateral sinus according to personal (also operative) and general experience. All pertinent facts are discussed with as much exactness as reserve, which a subject, in which many important points are still doubtful or uncertain, surely requires.

The author has collated from literature 137 suitable cases,[1] and added 6 of his own from the surgical clinic at Helsingfors. Among the clinical histories the operated cases are also communicated.

---

[1] The author could not as yet use Lane's, Jansen's, Koerner's, and Macewen's publications.

The first part contains 15 autopsies: Historical, anatomical synopsis, thrombosis in general, classification of thromboses of the cerebral sinuses, course and complications, diagnosis and differential diagnosis, prognosis, treatment, determination of location of lateral sinus, operative procedure for opening and cleaning the lateral sinus and the vena jugularis interna, critical synopsis of the operative results and bibliography of papers quoted in the first part. The second part contains the histories of cases which are arranged according to the following points of view:

1. Cases of thrombosis of the lateral sinus without meningitis and cerebral abscess.
2. Cases with meningitis.
3. Cases with cerebral abscess.
4. Cases with meningitis and cerebral abscess.
5. Cases without positive statement of complication.
6. Cases treated by opening of lateral sinus.

The historical synopsis begins with the first observation, Abercrombie's (1818), and ends at the latest observations and operative cases, which are judged with agreeable impartiality (Zaufal, Horsley, Lane, Ballance, etc.). The anatomical views are principally derived from Gegenbaur and Henle, Klein and Zuckerkandl.

The pathogenesis of thrombosis contains, in general, all prevalent theories and experiments (from Virchow up to date) on its development, the termination of thrombi, and their classification. In the chapter on pathological anatomy the author discusses the changes in the ear and petrous bone, the relation of the sinus transversus, the condition of the thrombus, its extent to the lateral sinus only, to the large vessels on the same and the other side (with figures), and a case (XIII.) of thrombosis of the sinus lateralis, petrosus superior, longitudinalis, and confluens, the condition of the thrombus in the cervical vessels, the lateral cervical abscesses, their perforation, the burrowing suppuration, the complication with pachymeningitis externa (in most cases), and with intradural abscess (in 36 cases). One half of the cases were without complication; with meningitis and cerebral abscess, 67; without both, 27; without meningitis with cerebral abscess, 13; with both, 15.

Table II. presents the extent of the exudation of the pia, Table

III. the location of the cerebral abscess, Table IV. the extent of the exudation of the pia and location of the cerebral abscess, Table V. the pulmonary affection in non-operated cases, Table VI. the metastases obtained.

The sixth *part* on *etiology* is historically treated : from Avicenna up to the bacteriological period. In two cases the author, in accordance with the reviewer, could *positively* (culture) furnish the proof that the infection was caused by the *streptococcus pyogenes.* The author then discusses the effect of the micro-organisms, their paths of infection, principally according to the observation of others. With reference to the paths of infection, the author then discusses principally : caries of the petrous bone, empyema, cholesteatoma and sclerosis of the mastoid process, the thrombosis of the small veins (emissaries), pachymeningitis externa, otorrhœa in consequence of different diseases, principally infectious ones, acute and chronic otorrhœa, the acute being in the author's statistics represented only in 15 per cent. of the cases (in Hessler's statistics in 26 per cent.) ; the briefest period was 4 and 6 days, in more than 70 per cent. of the chronic cases 5 years and more ; according to the author and Robin, the greatest percentage belongs to cases of from 5 to 10 years' duration. The frequency of thrombosis of the lateral sinus increases with *age ;* maximum between twenty-one and thirty years ; the *male sex* preponderates. In the *female sex* meningitis is a rare complication.

The *great* difference between the *right* and *left* side, as it was found by Robin and Koerner, could not be confirmed by the author, but his difference (7.8 more on the right side) is greater than Hessler's (4 per cent.). Statistically it is of interest, that the larger number of thromboses occurs on the right side in the male ; according to Robin, however, in the female on the left side.

Among the predisposing diseases, the author found in seven cases tuberculosis, in one case severe palatal syphilis, which apart from the smaller power of resistance, act in consequence of occlusion of the Eustachian tube by impeded efflux of secretions ; local predisposition is effected by imperforate membrana tympani, high seat of perforation (Shrapnell's membrane) ; furthermore, colds, trauma, operative interference (in 4 cases operation of polypi !), insufficient or inadequate treatment.

In the seventh part the author fully dwells from the pathologico-anatomical standpoint upon the symptomatology of the thrombosis of the lateral sinus and its complications ; upon which the reviewer need not dwell. "It cannot be denied, that sinus thrombosis, as supposed by Lebert, has been in several cases the connecting link between the otitis media and the cerebral abscess." The reviewer has, during the last year, observed a case of double formation of cerebral abscess; both were successfully operated by emptying the abscess, and later on, nevertheless, fatal issue occurred—the older abscess, according to the autopsy, must be considered as caused by reversed transportation in consequence of a latent thrombosis of the lateral sinus of long existence.

The thrombosis of the lateral sinus may develop with or without a predromal stage of pain. The author found acute increase of pain in 42 of his cases. The disease may, however, suddenly appear without prodromi.

The *fever*, illustrated by fever curves, is carefully discussed. The daily differences are the largest in the uncomplicated form (in meningitic complication mostly but 1°; abscess has no influence!) 4–5° Réaumur. The reviewer has observed a case with 5.4°. In 84 of the observed cases, chills are positively ascertained. In Case 15 only, it is distinctly mentioned, that the affection ran its course *without any chill.* I have observed a striking case of this kind and was induced on account of the absence of fever and for especial clinical reasons, as proved by the autopsy, to make a wrong diagnosis (*cp.* Germ. edition, vol. xxv., p. 212). Very frequently, according to Lane (*l. c.*), even all symptoms are missing until the time for an operation has passed.

From a tabulated synopsis it results, that the chills appear most frequently during the first days[1]; in some cases, however, not until the second or third week. By comparing his tables on the extent of the thrombosis and the chills, the author found that, in most cases in which the thrombosis extended to the jugular vein, chills or an unusually rapid course of the disease are noted. The author believes that extent of thrombosis and intensity of infection are in casual connection.[2] "If the thrombus is but partly in suppuration or putrefaction, and it occludes centrally the sinus or the jugular completely, the infection of the circulatory path is mostly entirely missing." Koerner, *l. c.*, p. 53—Rev.

*Headache* was unilateral in 21 cases, in 16 cases in the forehead, in 3 cases upon the vertex, and 72 cases diffuse.

---

[1] In 4 cases only it appeared in the second week, and in 2 other cases still later.

[2] According to these observations, Lane's opposite view, that the clinical symptoms of septic infection appear the more severe, the less the thrombus is extending, becomes untenable.—Rev.

*Vomiting* is an initial symptom ; it existed in uncomplicated cases 15 times (25 per cent.), in those complicated with meningitis 10 times (28 per cent.), in those complicated with cerebral abscess 4 times (30.7 per cent.), and in those complicated with the two latter affections 4 times (28.5 per cent.).

*Vertigo* is also an initial symptom, in 4 cases only it was a late symptom, which is markedly rare in cerebral abscess. It appeared in the uncomplicated cases in 13.3 per cent., in the cases with meningitis in 30.8 per cent., in those with cerebral abscess in 7.6 per cent., and in those complicated with the two latter affections in 35.7 per cent.

No symptom in uncomplicated thrombosis of the lateral sinus is so varying as the *condition of the sensorium ;* there are found all transitory states from its entire freedom to marked furibund deliria, the latter in 26.7 per cent., in those complicated with meningitis in 42.3 per cent.

With reference to *œdema of the mastoid region* (Griesinger), the author's statistics result in finding its occurrence 49 times, with thrombosis of the emissary *post mortem* in 15 cases. The author considers this *symptom*, which may occur from the beginning or during the second week, as *uncertain*, because œdema of the mastoid cells, which is noted down 66 times in his entire material, may also produce œdematous swelling upon the mastoid. On the other hand, according to the reviewer's opinion, Koerner, *l. c*, p. 59, considers Griesinger's symptom justly as important, when the œdema of the mastoid is limited only to the region of the mouth of the mastoid emissary, viz., *behind* the mastoid process. With abnormal course of the emissary the swelling may be situated toward the centre of the occiput (*cp.* the reviewer's observation, Case 31 of the cases collated by the author).

*Just as unreliable* as mastoid œdema is, according to the author, *the œdema of the occiput* due to thrombosis of the condyloid emissary, which is noted four times in his collected cases.

"*Œdema of the temporal region*" is represented by three cases. "Moos tries to explain this œdema by the persistence of the fœtal sinus petro-squamosus, which enters the sinus transversus and communicates with the temporal veins. Although this hypothesis is not fully proven by autopsies, it seems at any rate to be too early to reject it without further ceremony, as A. Brieger has done in his dissertation."

Furthermore, the author discusses the *pain* and swelling above the jugular vein. This vein was thrombosed completely in 34 cases, in the upper portion only in 20 cases; corresponding symptoms thus existed in 54 (38 per cent.) cases: œdema, sensibility, swelling, or a hard band, under the restriction, of course, that other affections than thrombosis of the jugular, *e. g.*, burrowing abscesses from the mastoid process, may cause painfulness and swelling of the lateral region of the neck.

Furthermore, the author discusses the *symptoms due to extension of thrombosis to the other cerebral sinuses:* Sinus cavernosus (7 times), longitudinalis (9 times), and sinus lateralis of the other side (6 times), in which case these symptoms could be made use of, if contra-lateral thrombosis of the jugular vein existed.

Characteristically stiff *position of the head* toward the affected side was found in the author's cases 4 times, *glandular swelling* at the neck 11 times, suppurating glands 5 times, *venous* hemorrhage from the ear 3 times, without positive proof of the source of hemorrhage from the lateral sinus. Among the *nervous* symptoms (13 per cent. of the cases) the author discusses the affection and paralysis respectively of the posterior cerebral nerves, their connection with thrombosis (*cp.*, the most exquisite case of Beck. —REV.) of the facial, of the anterior cerebral nerves in thrombosis of the cavernous sinus, and dilatations of pupils in consequence of increased cerebral pressure.

*Neuritis optica* is rare in uncomplicated cases, and mostly to be expected at the beginning of the second week.[1] Case 15 terminated in atrophy; on the other hand, Jansen asserts that restoration never leads to atrophy. He considers the choked disc, which, moreover, may increase after operation, as an important symptom of sinus thrombosis. It is, according to Jansen, always bilateral and is a differential sign which may serve to exclude with certainty the wrong diagnosis of typhoid fever, malaria, and pneumonia. Jansen has observed eight times nystagmus of both eyes. Jansen quotes all heretofore published cases observed in aural affections, with the exception of that of the reviewer (these ARCHIVES, vol. xi.), although Kipp is cited, by whom the reviewer's observation is mentioned. The nystagmus-like movements are, according to Jansen, symptoms of somewhat uncertain value, admit rather the inference of a labyrinthine affection, and, in the absence of the latter and also of leptomeningitis, are of a certain importance for the diagnosis of sinus phlebitis and sinus periphlebitis in the parts adjoining the temporal bone.

---

[1] Not unfrequent according to Koerner, and more frequent than in meningitis and brain abscess according to Pitt.

*Icterus,* observed by Forselles in 17 cases (15 per cent.), is hematogenous. Petechia and herpes (nasalis) were seen in 1 case. *Enlargement of the spleen* (in two infarcts being present) was noted, partly during life, partly at the autopsies, 37 times. (The tumor of the spleen is, according to Koerner, said *never to be absent* in the pyæmic form.—REVIEWER.)

### *Complications.*

*Pachymeningitis externa* and *extradural abscess.* The former exists in most cases, at times as a connecting link in the production of the infection of the sinus, without especial reference, of course, having been made to this fact in the histories. The latter is noted in 26 cases, but was only exceptionally diagnosticated before the autopsy.

*Meningitis* occurred alone in 26 cases, and together with cerebral abscess in 14 cases. The pyæmic symptoms were less pronounced with this complication. In the pure cases, *e. g.*, pulmonary complications occurred in 55 per cent., in those combined with meningitis in 30.8 per cent., in those combined with meningitis and cerebral abscess in 28.6 per cent. Neuritis optica, however, is more frequent. With reference to the other symptoms *cf.* the original.

Cerebral abscesses were most frequent in the temporal lobe, then in the occipital, and in one case only in the parietal lobe; topical symptoms are nowhere noted, vertigo quite rarely (only in one case among three cases of cerebellar abscess).

The author states as follows: "I found the character of the pulse to be the only characteristic sign when topical symptoms were absent. It is usually slow (75–108[1]) even when fever and pyæmic phenomena were present."

It is worthy of note that, according to the author, the pulmonary symptoms appear much later than the chills, and a difference of from one to three weeks may exist between the appearance of thrombosis of the jugular vein and the pulmonary symptoms.

*Albumen* occurs frequently in the urine, mostly during second week, blood in 2 cases, *diarrhœa* in 19 non-operated cases, rarely at the beginning, mostly during the third week. *Metastasis in the liver* in one case; *metastases in the joints* are frequent, but may undergo retrogressive changes, although mostly a long time after the first chill and after thrombosis of the jugular vein has occurred.

---

[1] These figures must be erroneous, as they are too large for the minimum and too small for the maximum. v. Bergmann found 46, Heimann 44, and the Reviewer 36 beats, and in the terminal stage 136.

The *average duration of disease* in the 60 uncomplicated non-operated cases lasted from 3 to 4 weeks. The course, however, may be rapidly fatal, or more protracted.

The *diagnosis* and more especially the *differential diagnosis* has to consider: meningitis, cerebral abscess, intradural abscess, typhoid fever, malaria, miliary tuberculosis, septic endocarditis. The details should be perused in the original.

Although, for the *prognosis*, the possibility of healing by nature through transformation of the thrombus into connective tissue is to be considered, still most cases terminate fatally without operative interference. The author, therefore, warmly pleads for the latter, *viz.*, not only for opening and emptying the lateral sinus, but also for ligating and opening the jugular vein, in order to prevent general infection. His statistics, for which the author uses his own (4) cases operated with fatal issue, demonstrate: without ligation of the jugular, 40 % mortality and 53 % recovery; with ligation, 37.5 % and 62.5 %, respectively.[1]

According to measurements taken from 17 autopsies, the author recommends that the operation be performed at a point 9 *cm* distant from the prominentia occipitalis externa, upon a line drawn from the upper border of the orbit to the prominence, and that this be done even after the mastoid has been exposed by chiselling. The latter view is not in accordance with that of the reviewer, since the sinus is readily reached from the mastoid wound, enlarged backwards. The author uses trephine and bone forceps in order to avoid a possible concussion and detachment of the thrombus.

**The Lip-Reading of Persons with Hardness of Hearing.** Guide according to his own method of instruction. By Julius Müller, Berlin. With a preface by Prof. Dr. A. Lucae, Private Medical Councillor and Director of the Royal Aural Clinic of the University at Berlin. Reviewed by A. Barth, Marburg. Review translated by M. Toeplitz, New York.

Nobody will argue against the fact, that it is just as necessary for persons with extreme hardness of hearing to read from the lips as it is for deaf-mutes. Since there are but a few individuals who learn lip-reading without instruction, this book may be of great assistance in this respect to many people. It would be of much more value if, as Lucae expresses it in the preface, most people were not lacking in the necessary energy for auto-instruction. They should be directed to a teacher, but the book will, at any rate, assist the instruction. It begins with a historical introduction upon the instruction of deaf-mutes. It then discusses the difference in the instruction of persons with hardness of hearing and of deaf-mutes. The former should only read from the lips, the latter should at the same time learn how to speak. The same method is, therefore, not adapted to both. In the following chapter on instruction in lip-reading, it is stated that people hard of hearing should learn to comprehend fluent speech. The instruction, therefore, does not occupy itself with position, but with movements of speech. The consideration of the latter is followed by remarks upon the accentuation of syllables, the best position of the learner with regard to the speaker, illumination, the manner of carrying on the conversation, observation of mimicry, and principally the right selection of the speaker. It is emphasized that in speaking, not the amount, not the quality, but the correct arrangement and treatment of the subject are of the greatest importance. The first introductory part is followed by the second for practice, in which the exercises are systematically treated in separate chapters. We hope that the book may be of great value to many persons hard of hearing, and facilitate their intercourse with others and that of their fellow-men with them.

---

[1] According to Jansen, the question whether the jugular should also be ligated cannot as yet be decided.

# EDITORIAL NOTICE.

The abundant supply of original contributions makes it impossible to furnish unabridged translations of all the papers from one edition into the other.

To secure priority, and inform our readers promptly of the contents of both editions, the titles of all the papers of one edition will be printed in the next issue of the other. Translations will be published as early and as fully as the space at our disposal will permit, and abstracts of all original contributions in either edition will be embodied in our systematic reports on the progress of otology.

Reprints of the original papers of the German edition are deposited with Dr. H. Knapp, 26 West 40th St., New York, and Dr. U. Pritchard, 26 Wimpole St., London, who will gladly loan them to any one who desires to use them for reference. Reprints of the originals of the English edition can in the same way be had from the publisher of the German edition, I. F. Bergmann, Schwalbacher Strasse 20, Wiesbaden.

H. KNAPP,
S. MOOS,
U. PRITCHARD.

---

The following original papers appeared in the double-number of the *Zeitschrift für Ohrenheilkunde* (German edition of these ARCHIVES), issued July, 1894.

1. Three fatal cases of otitic intracranial complications. By S. Moos, Heidelberg. With two temperature curves. [To be translated.]

2. The hearing for speech and for tones in general, and the measurement of the latter by Gradenigo's auditory field. By H.

ZWAARDEMAKER, Utrecht. With an illustration in the text. [Translated.]

3. A contribution to the symptomatology of rhinitis chronica atrophica with especial reference to the affections of the organ of hearing. By J. MORF, Winterthur. [Translated.]

4. On double-hearing. By HANS DAAE, Christiania. [Translated.]

5. Primary disease of the bony capsule of the labyrinth. By ADAM POLITZER, Vienna. With eight illustrations in the text. [Translated.]

6. Addendum to the article (No. 1 *supra*) upon three fatal cases of otitic intracranial complications. By S. MOOS, Heidelberg.

Then follow: Translations from the English edition; the systematic report upon the progress of otology and rhinology, by A. BARTH, Marburg, and A. HARTMANN, Berlin; and reviews.

---

Contents of the last number of the *Zeitschrift für Ohrenheilkunde* (the German edition of these ARCHIVES), published in September, 1894.

*A.*—ORIGINAL ARTICLES:

1. A Second Case of Bilateral Ankylosis of the Stapes, Diagnosticated during Life, together with the Report of the Autopsy, and of the Manometric and Histological Examination. By FR. BEZOLD, Munich. (With three illustrations in one plate.)

2. The Hearing in Bilateral Congenital Atresia of the Auditory Meatus, with Rudimentary Auricle. By FR. BEZOLD, Munich.

3. A Case of Pachymeningitis Externa ex Otitide Cured by Trephining. By A. GUYE, Amsterdam.

4. Contributions to our Bacteriological Knowledge of Otitis Media Purulenta Chronica. By LEOPOLD STERN, Metz.

5. A Case of Epithelial Carcinoma of the Cartilaginous and Membranous Auditory Meatus and of the Auricle. By ALFRED DENKER, in Hagen, Germany. (With an illustration in the text.)

6. A Contribution to the Diagnosis and Treatment of the Formation of Cholesteatoma in Otitis Media Purulenta. By A. SCHEIBE, Munich.

*B.*—TRANSLATIONS FROM THE ENGLISH EDITION, AND REVIEWS OF BOOKS.

# Obituary.

The death of Prof. HERMANN VON HELMHOLTZ, September 8, 1894, has been noticed in the October number of the ARCHIVES OF OPHTHALMOLOGY with remarks on the eminent scientist's life, character, and work, in particular his unparalleled merit in physiological optics. It behooves us gratefully to acknowledge what services he has rendered to Otology. His masterly investigation of the *Mechanism of the Ossicles of Hearing* convinced everybody that another very important problem in the physiology of the higher senses had been permanently solved.

Parallel with his investigations in physiological optics were those in physiological acoustics. For ten years he worked simultaneously at both. His *Treatise on Tone-Sensations*, though less extensive, may be said to be even more fundamental than his large work on *Physiological Optics.* With admirable penetration he—the first as far as we know—analyzed both mathematically and experimentally the third quality of sound, timbre (clang-tint), and demonstrated that, unlike the two other qualities, intensity and pitch, it was produced by a combination of tones, consisting of a fundamental tone and a number of harmonics, which he determined first mathematically (using Fourier's series), and then experimentally by having a number of balls ("resonators") made, which were tuned to the harmonics (Obertöne), the requisite number of vibrations of which, determined mathematically, was obtained by the corresponding interruptions of electric currents.

To determine the number of vibrations of any given sound with greater accuracy, he perfected the siren and constructed his *double siren.*

These studies have been as important for the theory of music, even for the construction of musical instruments, as the ophthalmoscope and his optical investigations have been for ophthalmology.

Helmholtz's searching mind logically and with unerring precision led him from the cultivation of one field to the exploration of the neighboring territory, and in all departments of his scientific labor he was not only an explorer but also a teacher. Many of his pupils are now men that have won distinction. Among those near us I may mention Dr. Albert H. Buck of New York, and Dr. Chas. H. Burnett of Philadelphia, whose researches on particular points in the mechanism of the ossicles, made in his laboratory, were published in the first and second volumes of these ARCHIVES.

May we not consider Helmholtz's simultaneous cultivation of physiological optics and acoustics as an explanation of the legitimate tendency of many physicians, especially in this young and enterprising country, to study and practise ophthalmology together with otology? Though anatomically these two departments are not closely connected, they have physiologically a great deal in common. The methods of examination and the functional disturbances of the organs of vision and hearing, as well as the physiological phenomena of the impression, conduction, and perception of light and sound are like words of two allied languages. The scholar that knows the one has a natural desire to learn the other.

H. K.

# INDEX OF SUBJECTS AND AUTHORS.
## VOL. XXIII.

Acoumeter, 88
Acoustic Nerve, Origins of the, 324
Adenoid Vegetations, Death following Removal of, 362
Aged, Investigations of the Hearing of the, 214, 228
**Alderton**, Investigations with Tuning Forks of the Middle Register in over Six Hundred Cases, 171
**Allen**, Remarks on the Anatomical Points Concerned in the Stacke Operation, 35
Anatomy, Reports on, of the Hearing Organ, 319
Anchylosis of the Stapes and Nerve Deafness with Manometric Examinations, 48
Antrum, Diseases of the, 124, 361
Aphasia, Localization of, 113

Basal Fracture, Cases of, 209
**Bauer**, Report of the Transactions of the Section of Otology of the 65th Meeting of the Society of German Naturalists, 86
**Bezold**, Case of Anchylosis of the Stapes and a Case of Nerve Deafness with Manometric Examinations and Autopsies, 48; Investigations Concerning the Average Hearing of the Aged, 214, 228
Book Reviews, 142, 241, 371
Brain, Abscess of the, 111, 349; Otitic Abscess of the, with Recovery after Operation, 155; Three Fatal Cases of Otitic Complication of the, 188
Brain-Tumor, History of a, 304
British Notes on Otology, 134, 245
**Burnett**, "System of Diseases of Ear, Nose, and Throat," 147

Carbonic Acid, Affection of Auditory Nerve after Poisoning by, 86
Carotid, Bad Result of Ligating the, in Ear Diseases, 98
Cholesteatomata, Operations for, 107, 345
Colored Hearing, 331

**Daae**, "Double-Hearing," 283
Deaf-Mutes, Hearing of the, 325
Diplacusis Monauralis, 280
**Dunn**, Case of Basal Fracture, 209; Case of Otitis Hæmorrhagica Externa, 209

Ears, Reciprocal Relations between the Two, 329
Eczema, Treatment of, with Iodol, 101
External Ear, Treatment of Diseases of the, 101, 339

**Forselles**, "Thrombosis of the Lateral Sinus Due to Purulent Otitis Media, and its Operative Treatment," 371
Fracture, Two Cases of Basal, 58

German Otological Society, Second Meeting of the, 128
GOUGENHEIM and GLOVER, "Atlas of Laryngology and Rhinology," 241
GRADENIGO, Monaural Diplacusis, 280
GRIFFITHS, Dr. NEIL, Obituary Notice of, 253

Hearing, Central Conduction of, and Finer Anatomy of Inner Ear, 321
Hearing Organ, Report on Progress in Anatomy of the, 92
HELMHOLTZ, Obituary Notice of, 382
HENSMAN, Dr. ARTHUR, Obituary Notice of, 254
Highmore's Antrum. See Antrum.
Hydrogen Peroxide, Hæmostatic Properties of, 355
Hysterical Aural Affections, 89

Instruments and Methods of Examination, 99, 336
Intracranial Disease from Ear Suppuration, Systematic Procedure in Operations for the Relief of, 24
Iodine Bichloride, 98
Iodole in Ear Diseases, 101

JACOB, Dr. E. H., Obituary Notice of, 253
JACOBSON, "Text-Book of Otology," 142

KNAPP, H., Case of Brain Abscess; Opening of the Mastoid and Skull; Recovery, 155; Case of Primary Tuberculosis of the Mastoid, 64; on Sero-Mucous Cysts beneath the Wing of the Nose, 67; Removal of Sequestra and of a Tooth from the Floor of the Nose, 71; Supplement to the Communication on the Removal of Sequestra and Tooth from the Floor of the Nose (71), 152; Supplement to the Paper on Sero-Mucous Cysts (67), 150
KOERNER, "The Otitic Diseases of the Brain and Spinal Cord," 143
KOERNER and WILD, Percussion of the Mastoid Process with Report of a Recent Case of Diabetic Caries of this Portion of the Temporal Bone, 73

Labyrinth, Primary Disease of the Bony Capsule of the, 225
Literature, Report on General Otological, 97, 334
Lobule, Bilateral Hæmatoma of the, 207

MACEWEN, "Pyogenic Infective Diseases of the Brain and Spinal Chord," and "Atlas of Head Sections," 144
Manometric Observations in Anchylosis of the Stapes, 48
Mastoid Process, Case of Primary Tuberculosis of the, 64; Hitherto Undescribed Course of a Disease of the, 235; Contributions to the Pathology of the, 1; Diabetic Caries of the, 73; Percussion of the, 73, 88; Temperature of the Body in Disease of the, 348
Meatus Externus, Diphtheria of the, 339; Tumors of the, 87
Middle Ear, Report on Progress in Diseases of the, 102, 340
MOORE, Dr. SAMUEL, Obituary Notice of, 253
MOOS, Hitherto Undescribed Course of a Disease of the Mastoid Process, 235; History of a Brain Tumor, 304; On the Diagnostic Value of Percussion of the Mastoid Process, 85; Three Fatal Cases of Otitic Intracranial Complications, 198
MORE, Coutribution to the Symptomatology of Rhinitis Atrophica, with Special Reference to the Affections of the Ears, 271

MOURE, "Manuel Pratique des Maladies des Fosses Nasales, de la Cavité Naso-Pharyngienne et des Sinus de la Face," 143
MUELLER, J., "The Lip-Reading of Persons with Hardness of Hearing," 378

Nasal Hydrorrhœa, Atropine Spray in, 358
Nasal Septum, Hæmatoma of the, 91
Naso-Pharynx, Anatomy of the, 94
Nerve Deafness, Manometric Observations in Cases of, 48
Nervous Deafness, Report of Treatment of, 112, 365
Nose, Aërial Pressure in the, 333; Case of Sero-Mucous Cysts beneath the Wing of the, 67; Larvæ in the, 121; Malignant Diseases of the, 122; Massage in Diseases of the, 357; Removal of Sequestra and of a Tooth from the Floor of the, 71: Syphilitic Diseases of the, 123; Tuberculosis of the, 358
Nose and Naso-Pharynx, Report of Treatment of Diseases of the, 114, 327, 333, 352

Obituary Notices, 149, 253, 382
Ossicles, Results of Operations on the, 105, 129, 346
Otitis Hæmorrhagica Externa, Case of, 211
Otitis Interna, Pathogenesis of, 88
Otitis, in Cirrhosis of the Liver, 104
Otitis Media in Infants, 341; Treatment of, with Digestive Ferments, 329
Ozæna, Use of Ozone in, 355

Physiology, Reports on, 95, 329
POLITZER, Primary Disease of the Bony Labyrinthine Capsule, 255
PRITCHARD, Systematic Procedure in Operations for the Relief of Intracranial Disease Secondary to Ear Suppuration, 24

QUINSY, Treatment of, 363

RANDALL, Bilateral Hæmatoma of the Lobule, 207; Can Important Topographical Relations of the Temporal Bone be Determined from the Form of the Skull? 162
Report of the Otological Section of the British Medical Association for 1894, 367
Report on the Progress of Otology in the First Half of the Year 1893, 92; of the Second Half, 319
REULING, Purulent Otitis Media, Leading to Caries of the Temporal Bone, Epimeningeal Abscess, and Death, without Involvement of the Mastoid Bone, 44
Rhinitis Atrophica, Symptomatology of, with Reference to Affections of the Ears, 271

SAPOLINI, Obituary Notice of, 149.
SCHMIEDEKE, Two Cases of Basal Fracture, 58
SCHMIEGELOW, Contributions to the Pathology of the Mastoid Process, 1.
Semicircular Canals, Functions of the, 330
Society of German Naturalists, Report of Section of Otology at the Meeting of the, 86.
Speech and Tones, Hearing for, Compared and Measured, 291
Stacke Operation, Remarks on Anotomical Points Concerned in the, 35; Various Modifications of the, 106
Stapes, Results of Removal of the, 129. See Ossicles

Temporal Bone, Can Important Topographical Relations of the, be Determined from the Form of the Skull? 162
Tinnitus Objectively Perceived, 90
Tonsil, Chancre of the, 126
Tonsillitis, Treatment of, 126

Tonsillotomy, Alarming Hemorrhage Following, 138
Tonsils, Methods of Removing the, 127
Tuberculosis of the Petrous Bone, 110
Tuning-Fork Investigations in over Six Hundred Cases, 171

WREDEN, Obituary Notice of, 149

ZUCKERKANDL, "Normale und pathologische Anatomie der Nasenhoehle und ihrer pneumatischen Anhaenge," 147
ZWAARDEMAKER, Hearing for Speech and Hearing for Tones in General, and the Measurement of the Latter by Gradenigo's Auditory Field, 291; The Presbycusic Law, 228

VOL. XXIII. No. 4

# ARCHIVES

OF

# OTOLOGY

*EDITED IN ENGLISH AND GERMAN*

BY

DR. H. KNAPP
OF NEW YORK

DR. S. MOOS
OF HEIDELBERG

AND

DR. U. PRITCHARD
OF LONDON

OCTOBER

NEW YORK
G. P. PUTNAM'S SONS, 27 & 29 WEST 23D STREET
AND NEW ROCHELLE, N. Y.
LONDON: 24 BEDFORD STREET, STRAND
WIESBADEN: J. F. BERGMANN'S Verlag
PARIS: J. B. BAILLIÈRE, 19 Rue Hautefeuille
1894

Price, per Number, $1 25 (5*s.* 6*d.*); Per Year, $4 00 (16*s.*)
Ophthalmology and Otology, together, per year, $9 00 (£1 16*s.* 6*d.*)
Entered at the Post-Office, New Rochelle, N. Y., as Second-Class Mail Matter

## I. ARCHIVES OF OTOLOGY,

PUBLISHED IN ENGLISH AND GERMAN IN NEW YORK AND WIESBADEN

BY

**Drs. H. KNAPP in New York, U. PRITCHARD in London, and S. MOOS in Heidelberg**

IN CONJUNCTION WITH

Dr. CRESSWELL BABER, of Brighton, England; Dr. THOMAS BARR, of Glasgow; Prof A. BARTH, of Marburg; Prof. E. BERTHOLD, of Königsberg; Dr. G. BRUNNER, of Zurich; Dr. SWAN M. BURNETT, of Washington; Sir W. B. DALBY, of London; Dr. E. FRÄNKEL, of Hamburg; Prof. J. GOTTSTEIN, of Breslau; Dr. E. GRUENING, of New York; Prof. A. GUYE, of Amsterdam; Dr. A. HARTMANN, of Berlin; Dr. A. HEDINGER, of Stuttgart; Dr. C. J. KIPP, of Newark, N. J.; Dr. B. LOEWENBERG, of Paris; Dr. F. M. PIERCE, of Manchester; Prof. E. DE ROSSI, of Rome; Dr. JAS. A. SPALDING, of Portland, Me.; Prof. H. STEINBRÜGGE, of Giessen; Dr. C. TRUCKENBROD, of Hamburg; Dr. O. WOLF, of Frankfort-on-the-Main; Prof. R. WREDEN, of St. Petersburg; and many others.

The *Archives of Otology* will be issued four times a year, and each yearly volume will contain about 400 large octavo pages, handsomely printed and illustrated.

The subscription, per year, will be $4.00, and the price, per number, $1.25.

**II. THE ARCHIVES OF OPHTHALMOLOGY** will be published four times a year, and each yearly volume will contain about 500 octavo pages, handsomely printed and extensively illustrated with wood-cuts and lithographs.

The subscription, per year, will be $5.00, and the price, per number, $1.50.

---

These journals will continue to publish original papers of standard value, comprehensive articles on subjects still under discussion, and systematic reports on the progress of Ophthalmology and Otology, thus keeping their readers informed of everything that is interesting to know, scientifically of importance, and, above all, practically useful.

Communications relating to Ophthalmology should be addressed to Dr. H. KNAPP, 26 West 40th Street, New York, N. Y., and those relating to Otology either to Dr. H. KNAPP, New York, N. Y, or to Dr U. PRITCHARD, 26 Wimpole St., London, W., England; those relating to the business of the journals to the publishers,

**G. P. PUTNAM'S SONS, Publishers and Booksellers,**

**New York:**
**27 & 29 West Twenty-third Street.**

**London:**
**24 Bedford Street, Strand.**

Dr. JULIUS FEHR'S

"COMPOUND TALCUM"

"BABY POWDER."

The "Hygienic Dermal Powder for Infants" and Adults.

Originally investigated and its Therapeutic Properties discovered in the year 1868, by Dr. FEHR, and introduced to the Medical and the Pharmaceutical Profession in the year 1873.

COMPOSITION:—Silicate of Magnesia with Carbolic and Salicylic Acids.
PROPERTIES:—Antiseptic, Antizymotic, and Disinfectant.

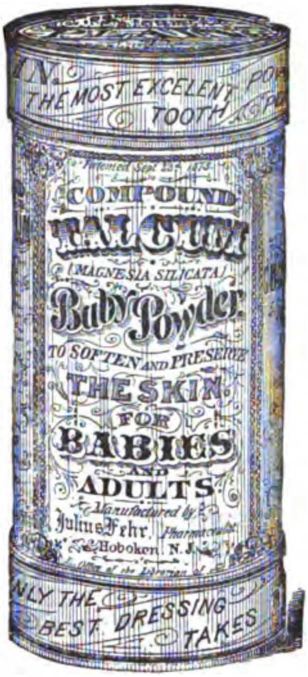
Useful as a GENERAL SPRINKLING POWDER, with positive Hygienic, Prophylactic, and Therapeutic properties.

Good in all Affections of the Skin.

SOLD BY THE DRUG TRADE GENERALLY.

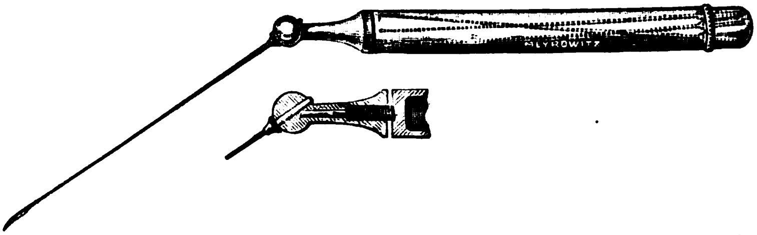
Per box, plain, 25c.; perfumed, 50c. Per dozen, plain, $1.75; perfumed, $3.50.

The Manufacturer: JULIUS FEHR, M.D., Ancient Pharmacist.
Established since 1859 in HOBOKEN, NEW JERSEY.
Only advertised in Medical and Pharmaceutical prints.



---

Dr. SPRAGUE'S EMERGENCY EAR CASE.



This Case is formed by the hollow metal handle, which will carry about four of the most frequently used ear instruments. The capstan head is so constructed as to hold the instrument firmly at the proper angle.

Price of Nickel-plated Case, without instruments . . $1.50
Price of same, with four instruments . . . . . . 6.00

E. B. Meyrowitz, Adjoining former premises 104 East 23d Street, N. Y.

---

H. A. KAYSAN, 34 Bond St., Brooklyn, N.Y.

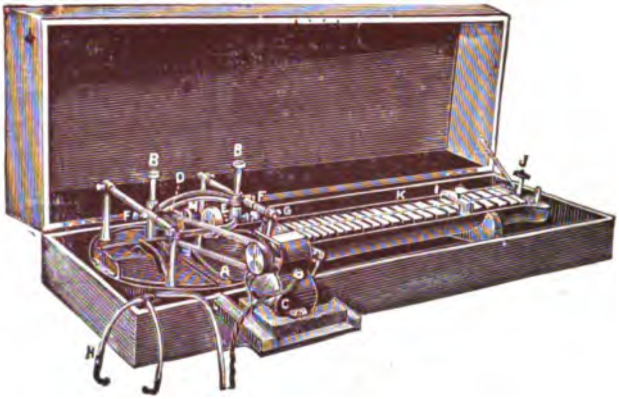
MANUFACTURER OF

ASEPTIC HOSPITAL FURNITURE
SURGICAL INSTRUMENTS

*SPECIALTIES:*

EAR INSTRUMENTS of all kinds and descriptions

White enamelled IRON and GLASS TABLES, CHAIRS, etc., for Physicians' Offices and Hospitals.



**The New Discovery**

**VIBRATORY MOTION.**

**The Acme of Scientific Massage**

# THE VIBROMETER.

**For Applying Dr. GAREY'S System of Massage for the Cure of the DEAF**

An Essential Apparatus in the office of every PHYSICIAN.

*Unqualified Success achieved with the VIBROMETER*

IN DEAFNESS AND TINNITUS AURIUM.

Send for descriptive pamphlets and price list.

**THE VIBROMETER CO., 210 N. Holliday St., Baltimore, Md.**

---

# SPECIAL NOTICE TO SUBSCRIBERS.

The subscription prices of the Archives for 1894 will be as follows

| | | |
|---|---|---|
| ARCHIVES OF OPHTHALMOLOGY | | |
| For United States, Canada, and Mexico | A year, | $5.00 |
| " " " " " | Single number, | $1 50 |
| For Great Britain | A year, | £1 0 0 |
| " " | Single number, | £0 6 0 |
| ARCHIVES OF OTOLOGY | | |
| For United States, Canada, and Mexico | A year, | $4.00 |
| " " " " " | Single number, | $1 25 |
| For Great Britain | A year, | £0 16 6 |
| " " | Single number, | £0 5 6 |

The two journals to one address:

| | | |
|---|---|---|
| For United States, Canada, and Mexico | A year, | $9.00 |
| For Great Britain | | £1 16 6 |

These prices include postage to the above mentioned countries.

G. P. PUTNAM'S SONS

NEW YORK:
27 and 29 West 23d Street

LONDON:
24 Bedford Street, Strand

B.P.L. Bindery,
D. 17 [illegible]

NB 786

3 2044 103 040 820